AD-A064 529 NEW YORK STATE DEPT OF ENVIRONMENTAL CONSERVATION ALBANY F/G 13/2
NATIONAL DAM SAFETY PROGRAM. BATAVIA KILL WATERSHED PROJECT DAM--ETC(U)
SEP 78 G KOCH DACW51-78-C-0035

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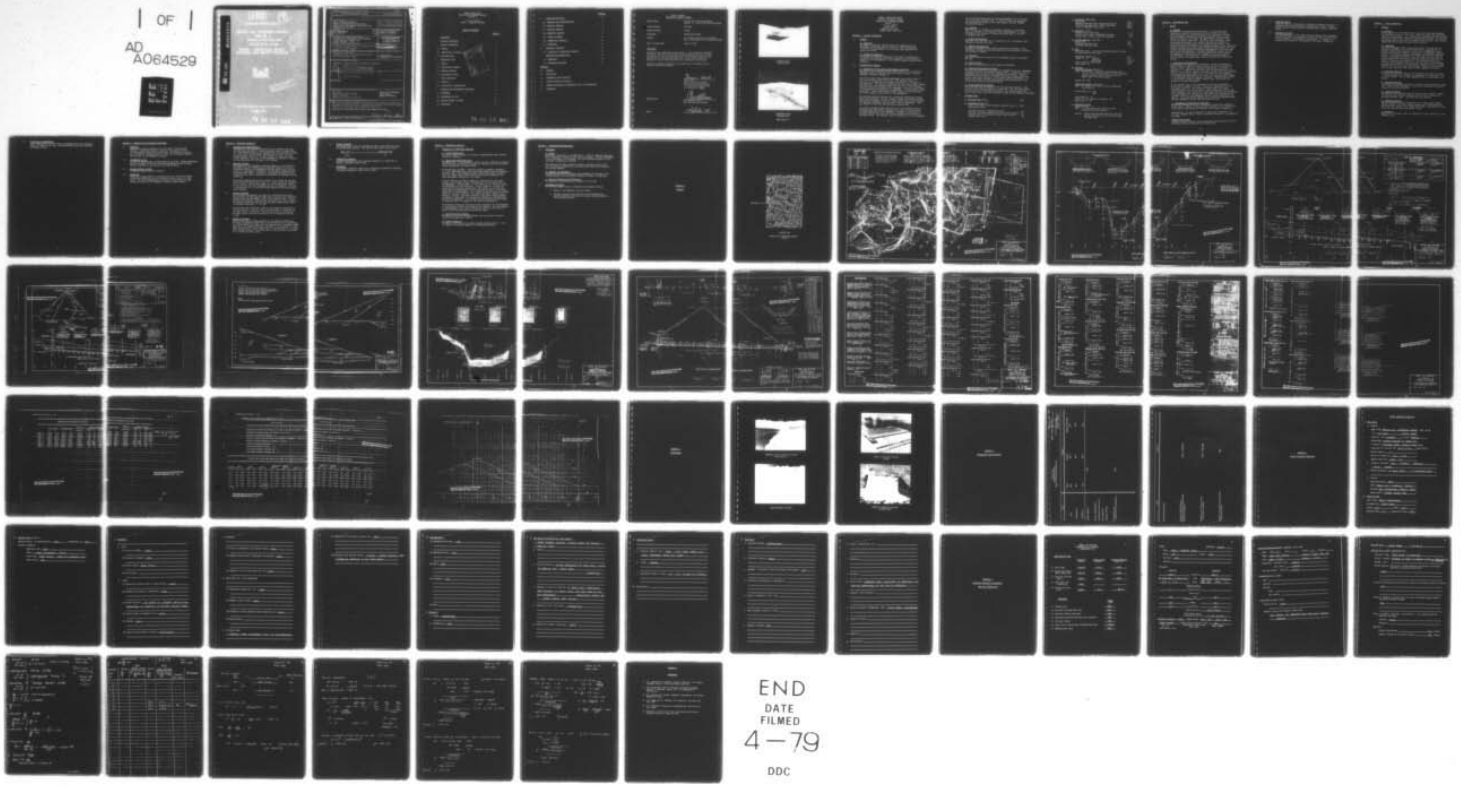

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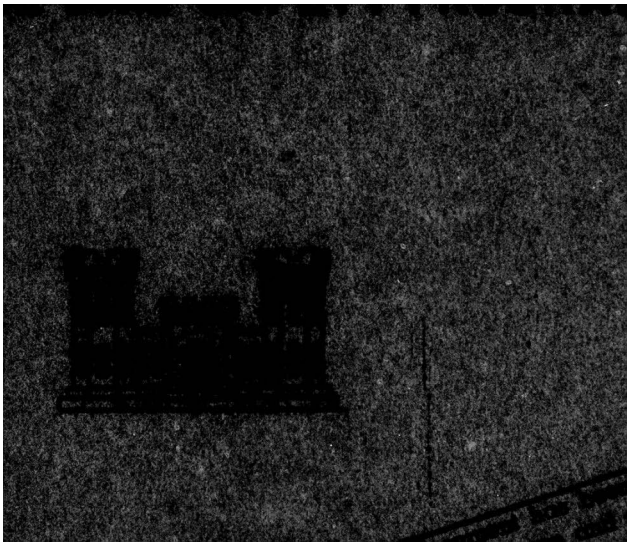

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Batavia Kill Watershed Project Dam #3
Mohawk River Basin, Greene County, New York
Inventory No. N.Y. 608

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Dam Safety
National Dam Safety Program
Visual Inspection
Hydrology, Structural Stability

Batavia Kill Watershed
Greene County
Mohawk River Basin

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

This report provides information and analysis on the physical condition of the dam as of the report date. Information and analysis are based on visual inspection of the dam by the performing organization.

Batavia Kill Watershed Project Dam #3 was judged to be safe.

393 970 Hm

DD FORM 1 JAN 73 1473 EDITION OF 1 NOV 65 IS OBSOLETE

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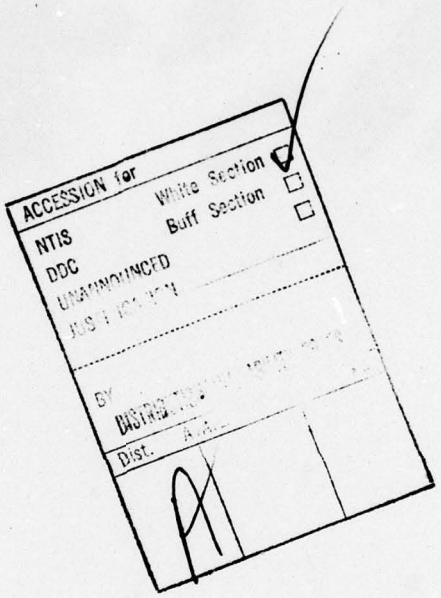
SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

MOHAWK RIVER BASIN
BATAVIA KILL WATERSHED PROJECT
DAM No. 3

I.D. No. NY-608
PHASE I INSPECTION REPORT

TABLE OF CONTENTS



PHASE 1 REPORT
NATIONAL DAM SAFETY PROGRAM

Name of Dam:	Batavia Kill Watershed Project Dam No. 3 - I.D. No. NY-608 (#191C-3818)
State Located:	New York
County Located:	Greene
Watershed:	Mohawk River Basin
Stream:	an unnamed tributary to the Batavia Kill (a tributary to the Schoharie Creek)
Date of Inspection:	July 11, 1978

ASSESSMENT

The Batavia Kill Watershed Project Dam No. 3 is a floodwater retarding structure. The earth fill structure was impounding water at the time of inspection to an elevation just above the principal spillway crest. Examination of available documents and a visual inspection of the dam did not reveal conditions which are considered to be unsafe.

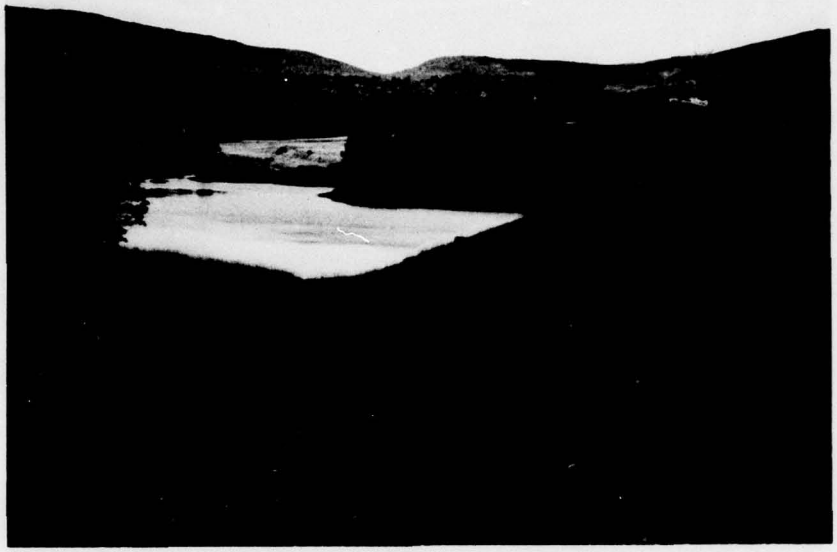
The total discharge capability of the spillways is adequate for the Probable Maximum Flood (PMF).

George Koch
Chief, Dam Safety Section
New York State Department of
Environmental Conservation
N.Y. License No. 45937

Approved by:

Col. Clark H. Benn
New York District Engineer

Date: 22 September 1978



UPSTREAM SLOPE
(looking East)

DOWNSTREAM SLOPE
(looking East)

BKWP DAM No. 3

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM
BATAVIA KILL WATERSHED PROJECT
DAM No. 3
I.D. No. NY-608
(#191C-3818)
MOHAWK RIVER BASIN
GREENE COUNTY, NEW YORK

SECTION 1: PROJECT INFORMATION

1.1 GENERAL

a. Authority

The Phase 1 Inspection reported herein was authorized by the Department of the Army, New York District, Corps of Engineers, to fulfill the requirements of the National Dam Inspection Act, Public Law 92-367.

b. Purpose of Inspection

To evaluate the existing conditions of the dam, to identify deficiencies and hazardous conditions, determine if they constitute hazards to life and property, and recommend remedial measures where necessary.

1.2 DESCRIPTION OF PROJECT

a. Description of the Dam and Appurtenant Structures

The Batavia Kill Watershed Project (BKWP) Dam No. 3 is an earthfill embankment having a principal spillway passing through it and two emergency spillways flanking it.

The 63 foot high, zoned compacted embankment has a crest length of 1100 feet and crest width of 20 feet. The upstream slope is 1 vertical on 3 horizontal and the downstream slope is 1 vertical on 2.5 horizontal. The crest and exposed slopes are heavily grass covered. That portion of the upstream slope below the level of the principal spillway crest did not appear to be riprapped. An earth cutoff trench of varying depth and width keys the embankment to the underlying foundation soils. Rock-lined channels extend outward on each side from the outlet channel, along the toe of the embankment.

The principal spillway consists of a rectangular reinforced concrete drop inlet structure, a 30 inch diameter reinforced concrete pressure pipe with anti-seepage collars, an impact basin, and an outlet channel. Two emergency spillways, one each side, flank the embankment. Both are located in earth cuts and are heavily grass-lined.

An internal drainage system consisting of 10 inch diameter fully bituminous coated perforated corrugated metal pipe is located beneath the downstream slope of the embankment. Seepage is collected and conducted through this drain and outleted through the side walls of the impact basin. The reservoir drain consisting of a 16 inch diameter

cast iron pipe extends from the upstream embankment toe to the base of the principal spillway riser. A vertical slide gate mechanism mounted along the inside of the riser controls the flow through the reservoir drain.

b. Location

BKWP Dam No. 3 is located on an unnamed tributary to the Batavia Kill, a tributary to the Schoharie Creek, approximately 1.5 miles Northeast of the village of Windham along Nauvo Road in the Town of Windham, New York.

c. Size Classification

This dam is 63 feet high and is classified as an "intermediate" dam (between 40 and 100 feet high).

d. Hazard Classification

The dam is classified "high" hazard because of the presence of approximately 60 homes and multiple-dwelling units downstream, including the village of Windham.

e. Ownership

This dam is owned by the Batavia Kill Watershed District of Windham, New York.

f. Purpose of Dam

The dam's primary purpose is for retarding floodwaters.

g. Design and Construction History

This dam and appurtenant structures were designed by the U.S. Department of Agriculture, Soil Conservation Service (SCS). Construction of the embankment began in 1970 and was completed the same year. The SCS office having jurisdiction for Greene County has a design folder containing hydrologic, hydraulic, and structural design information, the design calculations for modifications made during construction, and the as-built contract plans and documents.

h. Normal Operating Procedures

Water releases from the reservoir over the principal spillway. This structure has sufficient capacity to discharge a 100 year flood without flow occurring in the emergency spillways. For storms greater than the 100 year flood, flow will discharge through the two emergency spillways.

1.3 PERTINENT DATA

a. Drainage Area (acres)	2304
b. Discharge at Dam (cfs)	
Total (of all facilities excluding reservoir drain) @ Maximum High Water	17600
Principal Spillway @ Maximum High Water	132
Principal Spillway @ Emergency Spillway Crest Elevation	125
Reservoir Drain @ Principal Spillway Crest Elevation	28
Maximum Known Flood	90

c. Elevation (USGS datum)

Top of Dam	1746.9
Emergency Spillway Crest (Auxiliary Spillway)	1739.7
Principal Spillway Crest (Service Spillway)	1699.7
Invert of Reservoir Drain Inlet	1685.5

d. Reservoir (acres)

Surface area @ Top of Dam	71.0
Surface area @ Crest of Emergency Spillway	54.3
Surface area @ Crest of Principal Spillway	4.6

e. Storage Capacity (acre-feet)

Top of Dam	1415
Emergency Spillway Crest	975
Principal Spillway Crest	23.0

f. Dam

Embankment type: a two-zoned compacted earth fill with an earth keyed cutoff trench.

Embankment length (ft)		1100
Slopes (V : H)	Upstream	1 on 3
	Downstream	1 on 2.5
Crest elevation (USGS datum)		1746.9
Crest width (ft)		20

g. Spillway

Principal Spillway (Service):

Type: Uncontrolled, reinforced concrete drop inlet (2.5 x 7.5 ft) rising 18 feet; 30 inch reinforced concrete pressure conduit 326 feet long; an impact basin; an outlet channel.

Length (ft): Weir		15.0

Emergency Spillway (Auxiliary):

Type: Two grass-lined channels having trapezoidal cross sections

Bottom Width (ft):	East	50
	West	200
Side Slopes (V : H)		1:3
Length of level section (in profile) (ft)		50
Exit Slope (V : H)		1:32

h. Regulating Outlet

Reservoir Drain:

Type: 16 inch diameter cast iron pipe with a reinforced concrete headwall.

Control: Mechanically-operated vertical slide gate mounted along the inside of the principal spillway riser.

SECTION 2: ENGINEERING DATA

2.1 DESIGN

a. Geology

The Batavia Kill Watershed Project Dam No. 3 is located in the "Appalachian Uplands" physiographic province of New York State. These uplands are the northern extreme of the Appalachian Plateau and were formed by dissection of the uplifted but flat-lying sandstones and shales of the Middle and Upper Devonian Catskill Delta (395 to 345 million years ago). Relief is high to moderate. Maximum dissection occurs in the Catskill Mountain area where only the mountain peaks approximate the original plateau surface. The present surficial soil deposits have resulted primarily from glaciations during the Cenozoic Era (most recent 65 million year period), the last of which was the Wisconsin glaciation approximately 11,000 years ago. These soils were deposited, in general, directly by glacier ice and are composed of unstratified rock fragments of all sizes ranging from boulders to clay particles. Locally intercalated lenses of sand and gravel are common where ice-laid and water-laid deposition occurs.

b. Subsurface Investigations

A subsurface investigation was conducted by the Soil Conservation Service, with Mr. Ronald C. Page in charge, in the Fall of 1967 and Winter of 1968. Applicable subsurface information is included in Appendix A. In general the surficial soils at the project site consist of a thin layer of topsoil and recent alluvium over sand and gravel outwash and ice contact deposits over glacial till, over sandstone to a maximum explored depth of 61.0 feet. Only boring DH #352 located in the principal spillway extended to bedrock. Observed water levels in the borings is highly variable, ranging from 1 foot below the surface to no water encountered.

An intercalated lense of very permeable gravel was encountered in boring #54 at a depth of 25 feet. Concern was expressed by the review agent (NYS D.O.T. Soil Mechanics Bureau) that this gravel, encountered below the cut-off trench, would promote the flow of subsurface seepage if not controlled. Additional subsurface investigations were progressed which indicated that the gravel was discontinuous and a natural blanket of less permeable material existed upstream of the deposit. As a precautionary measure the toe drain was extended toward the left abutment to collect any flow from this area.

c. Embankment and Appurtenant Structures

The dam was designed by the Soil Conservation Service who prepared a design report. Twenty two drawings were prepared for the construction of the dam of which portions of several are included in Appendix A.

Hydraulically, the dam was designed to retard the floodwaters of a 100 year frequency storm, without a discharge occurring in the emergency spillways.

2.2 CONSTRUCTION RECORDS

Complete as-built contract plans and documents were available from the SCS office having jurisdiction for Greene County.

2.3 OPERATION RECORD

Since the dam is an uncontrolled, floodwater retarding structure, no operating records are maintained regarding water levels. However, during periods of heavy rainfall, SCS personnel do monitor reservoir levels.

2.4 EVALUATION OF DATA

The data presented in this report has been compiled from information obtained from the Soil Conservation Service as well as the New York State Department of Environmental Conservation. It appears to be adequate and reliable for the purpose of the Phase 1 inspection.

SECTION 3: VISUAL INSPECTION

3.1 FINDINGS

a. General

Visual inspection of the BKWP Dam No. 3 and the surrounding watershed was conducted on July 11, 1978. The weather was clear and temperatures ranged in the seventies. The inspection was conducted during a basically dry period during which occasional thunderstorms occurred. The dam was impounding water at the time of inspection with the water level slightly higher than the principal spillway crest elevation.

b. Embankment

The earth embankment shows no signs of distress. The vertical and horizontal alignment of the crest appears to be unchanged, with no visible surface cracks appearing on the crest or embankment slopes. There was no apparent sloughing, subsidence, or depressions occurring either. No noticeable seepage on the downstream slope was observed. However, discharges estimated at less than 5 gpm per outlet were observed flowing from the internal drainage system indicating that the system is functioning satisfactorily. The upstream slope did not have any visible riprap placed at or near the level of the principal spillway crest elevation. No undesirable vegetative growth or animal penetrations into the slopes were observed. However, the heavy grass cover on the slopes was high, making visual inspection difficult.

c. Principal Spillway

The principal spillway consists of the vertical drop inlet structure, a concrete pressure pipe through the embankment, an impact basin, and an outlet channel. All of these components were in satisfactory condition.

d. Emergency Spillway

Two grass-lined emergency spillways, one each side and located in earth cuts, flank the main embankment. Both were in satisfactory condition except for the need for mowing.

e. Regulating Outlet

The reservoir drain conduit and slide gate are the components capable of regulating the reservoir whenever the pool level is below the principal spillway crest. The slide gate does operate.

f. Downstream Channel

The outlet channel quickly transitions into a steep sided V-shaped natural channel. The outlet channel riprap was in satisfactory condition but the V-channel side slopes were eroded. Some debris and logs were also scattered along the channel invert.

g. Reservoir

There was no noticeable signs of landslides or soil instability in the reservoir area.

3.2 EVALUATION OF OBSERVATIONS

Visual observations did not reveal any problems which would adversely affect the safety of the dam. Minor deficiencies may be corrected by maintenance efforts.

SECTION 4: OPERATION AND MAINTENANCE PROCEDURES

4.1 PROCEDURE

Normal water surface elevation is at the crest of the principal spillway. Downstream flows are limited by the capacity of the 30 inch diameter reinforced concrete pipe. The reservoir provides 952 acre-feet of storage between the crest of the principal spillway and the crest of the emergency spillways.

4.2 MAINTENANCE OF DAM

The dam and appurtenances are maintained by the owner. Normal maintenance consists primarily of mowing the grassed emergency spillway bottoms, which at the time of the inspection had been deferred.

4.3 WARNING SYSTEM IN EFFECT

No apparent warning system is present.

4.4 EVALUATION

Sufficient storage capacity is provided such that controlled release of impounded floodwaters by the principal spillway occurs in a safe manner. The dam and appurtenant structures are satisfactorily maintained with mowing of the emergency spillway bottoms required.

SECTION 5: HYDROLOGIC/HYDRAULIC

5.1 DRAINAGE AREA CHARACTERISTICS

Delineation of the watershed draining into the reservoir pool area was made using the USGS 7.5 minute quadrangle sheet for Hensonville, N.Y. The watershed consists of grassed fields and woodlands situated in a rural area. Relief ranges from moderate to steep, with the steeper slopes occurring in the upper reaches and along the sides of the watershed. The slope of the watershed is generally triangular with the dam located at the apex of the triangle.

5.2 ANALYSIS CRITERIA

The analysis of the floodwater retarding capability of this dam was performed using the "Dimensionless Hydrograph" method of the Soil Conservation Service and recommended spillway design flood criteria of the U.S. Army Corps of Engineers. The SCS method establishes the hydrograph peak inflow. A short-cut, approximation method of flood routing was then used to determine the reservoir storage/peak outflow conditions.

The Probable Maximum Flood 6-hour rainfall of 23 inches was selected using the Weather Bureau TP-40 (Ref. 1). Direct runoff was estimated at 20.3 inches. An SCS curve number (CN) of 80 was used to account for the soil and land use development within the watershed. The time of concentration of 1.32 hours was taken directly from the SCS design report summary.

5.3 SPILLWAY CAPACITY

The principal and emergency spillways are uncontrolled structures. The principal spillway operates under weir or orifice flow conditions depending upon the floodwater inflow to the reservoir pool. During orifice flow operation, pressure flow develops in the 30 inch conduit. The emergency spillways were analyzed as broad-crested weirs having a discharge coefficient, C, of 3.087.

The spillways have sufficient capacity for discharging the peak outflow from the PMF. For this storm, the peak inflow is 18500 cfs and the peak outflow is 15900 cfs. When the spillways are discharging the peak outflow, the water surface will be 0.5 feet below the top of dam.

5.4 RESERVOIR CAPACITY

Normal flood control storage capacity of the reservoir between the principal and emergency spillways is 952 acre-feet which is equivalent to a runoff depth of 5 inches over the drainage area. Surcharge storage capacity to the maximum high water elevation is an additional 440 acre-feet; equivalent to a runoff depth over the drainage area of 2.3 inches. Total storage capacity of the entire dam is 1415 acre-feet; equivalent to 7.4 inches of direct runoff.

5.5 FLOODS OF RECORD

The maximum known flood was reported as being 10 feet above the crest of the principal spillway. The data for this flood is as follows:

Elev. (Ft.)	Discharge (cfs)
1709.7	90

5.6 OVERTOPPING POTENTIAL

Analysis indicates the total discharge capability is sufficient to prevent overtopping from the PMF.

5.7 EVALUATION

This dam has sufficient capability to impound and adequately discharge floodwaters expected to result from the PMF.

SECTION 6: STRUCTURAL STABILITY

6.1 EVALUATION OF STRUCTURAL STABILITY

a. Visual Observations

No signs of major distress of the dam and appurtenances were observed during the inspection.

b. Design and Construction Data

The BKWP Dam No. 3 was designed in 1968 by the Soil Conservation Service. The design data and as-built drawings are available from the SCS office having jurisdiction for Greene County.

The design data included a stability analysis, included in Appendix A, of the downstream slope with steady state seepage from the emergency spillway crest. The minimum factor of safety under these conditions was 1.75. There were no other stability analyses performed on the earth embankment, spillways or cut slopes.

As-built drawings included in Appendix A indicated that there was a change in the location, extent and composition of the three zones in the embankment. Revised sheet 7 of 22, dated 1/27/71, shows the zones and materials that were specified. As-built sheet No. 27 shows the zones that were actually constructed. The changes in the zones are insignificant except possibly for the reduction in Zone 3 at the downstream toe of the embankment. This change reduced the amount of seepage water that the zone 3 material can collect and remove from the zone 2 material. However, this hasn't created a significant problem because no seepage or other signs of distress were observed on the downstream slope of the embankment. The internal drainage system was constructed as specified and it is apparently functioning satisfactorily.

The available design and construction data indicates that the embankment is stable and no further investigations are required. The zone changes in the embankment do not have a significant effect on the stability analysis which was performed during design stages.

c. Post-Construction Changes

No changes to the dam and appurtenances that would cause structural stability problems have occurred.

d. Seismic Stability

The dam is located near the boundary between seismic zones No. 1 and 2; therefore, no seismic analysis is considered warranted.

SECTION 7: ASSESSMENT/RECOMMENDATIONS

7.1 ASSESSMENT

a. Safety

The Phase 1 inspection of the BKWP Dam No. 3 did not indicate conditions which constitute a hazard to human life or property. The earth embankment is not considered to be unstable. The total discharge capacity of the spillways is adequate for the PMF.

The design of this dam includes an internal drainage system to control the phreatic surface and to provide a safe outlet for foundation and internal seepage.

b. Adequacy of Information

Information concerning the design and performance of this dam is considered adequate for the purposes required for Phase 1 inspections.

c. Need for Additional Investigations

No additional investigations are necessary at this time.

7.2 RECOMMENDED MEASURES

The following tasks should be undertaken by maintenance forces:

a. Mowing of the emergency spillway inverts.

b. Periodic operation and lubrication of the mechanically-operated slide gate mechanism to insure continued operation of the reservoir drain.

APPENDIX A

DRAWINGS

VICINITY MAP

BATAVIA KILL WATERSHED PROJECT
DAM No. 3

LAYOUT DATA CURVE I

Δ = 101°55' T = 307.76
R = 251 E = 146.13'
D = 22°50' M = 92.36'
L = 445'

℄ STATION	DEFLECTION ∠	CORD DIST.
5+50	0° 00'	49.93
5+00	5° 42'	
4+50	11° 25'	
4+00	17° 08'	
3+50	22° 50'	
3+00	28° 32'	
2+50	34° 15'	
2+00	39° 58'	
1+50	45° 40'	
1+05	50° 48'	44.94

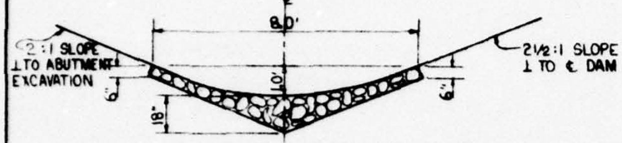
STONE GUTTER CONSTRUCTION DETAILS

CONSTRUCT OF OVERSIZE ROCK FROM THE EMERGENCY SPILLWAYS AND BORROW AREA. ROCK TO BE WELL GRADED WITH A MAXIMUM SIZE OF 18". LOCATION TO BE ALONG INTERFACE BETWEEN DOWNSTREAM SLOPE OF DAM AND THE ABUTMENT EXCAVATION.

ABUTMENT AND FOUNDATION EXCAVATION DETAILS

ABUTMENT EXCAVATION - SLOPE LEFT ABUTMENT TO 2:1 SLOPE, SEE SHEET 4. SLOPE EXCAVATION LIMITS 290' UPSTREAM AND 180' DOWNSTREAM FROM ℄ OF DAM

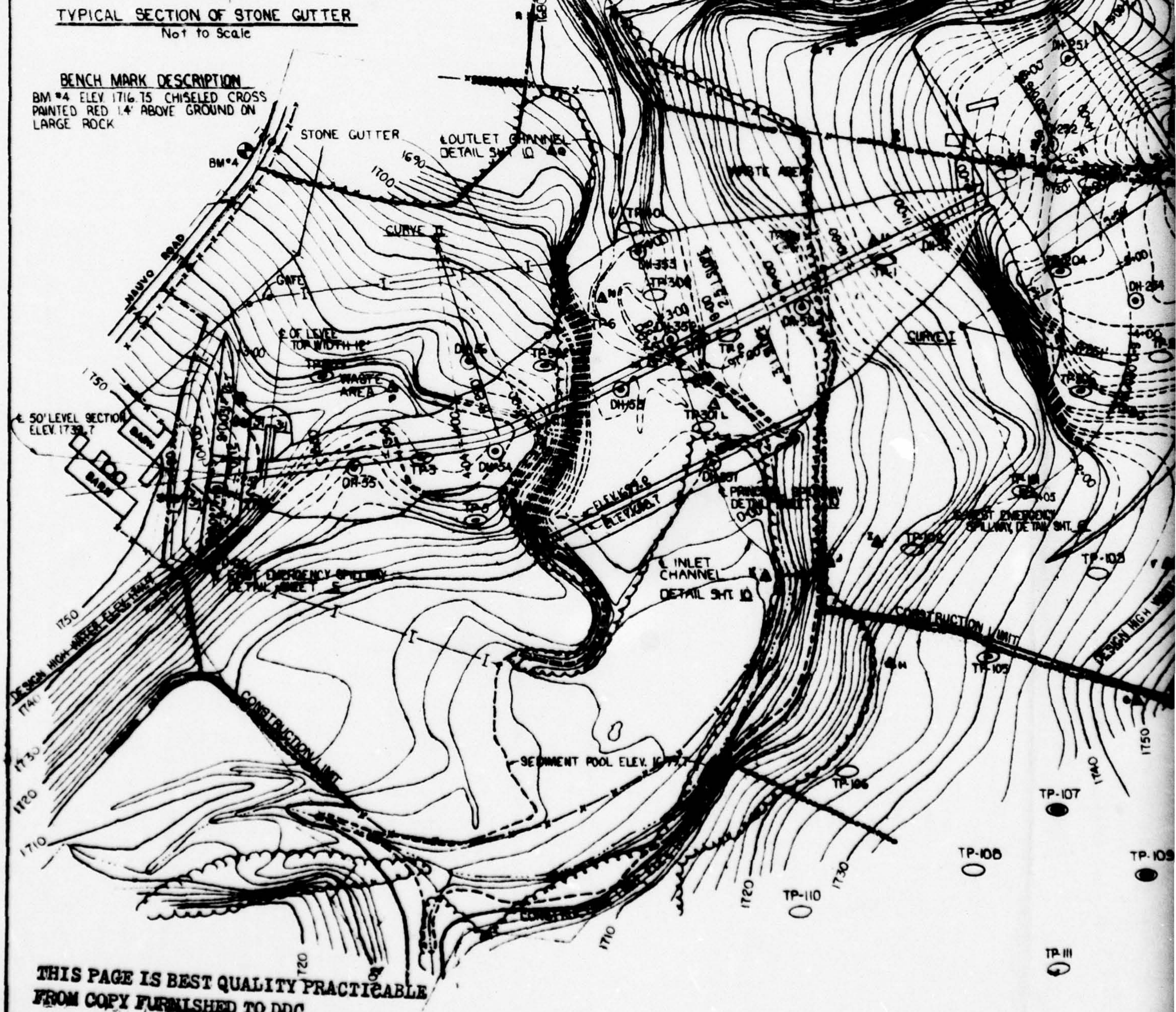
FOUNDATION EXCAVATION - EXCAVATE THE "J MATERIAL" FROM THE BASE WIDTH OF THE DAM IN THE FLOOD PLAIN UPSTREAM FROM THE CUTOFF TRENCH SEE SHEETS 4 AND 19 FOR DESCRIPTION OF MATERIAL "J"



TYPICAL SECTION OF STONE GUTTER
Not to Scale

BENCH MARK DESCRIPTION

BM #4 ELEV. 1716.75 CHISELED CROSS PAINTED RED 1.4' ABOVE GROUND ON LARGE ROCK



1

FOUNDATION
ETAILS

PE LEFT ABUTMENT TO 2 1
OPE EXCAVATION LIMITS 290'
STREAM FROM ℄ OF DAM

EXCAVATE THE "J MATERIAL"
F THE DAM IN THE FLOOD PLAIN
FF TRENCH SEE SHEETS 4 AND
ATERIAL "J"

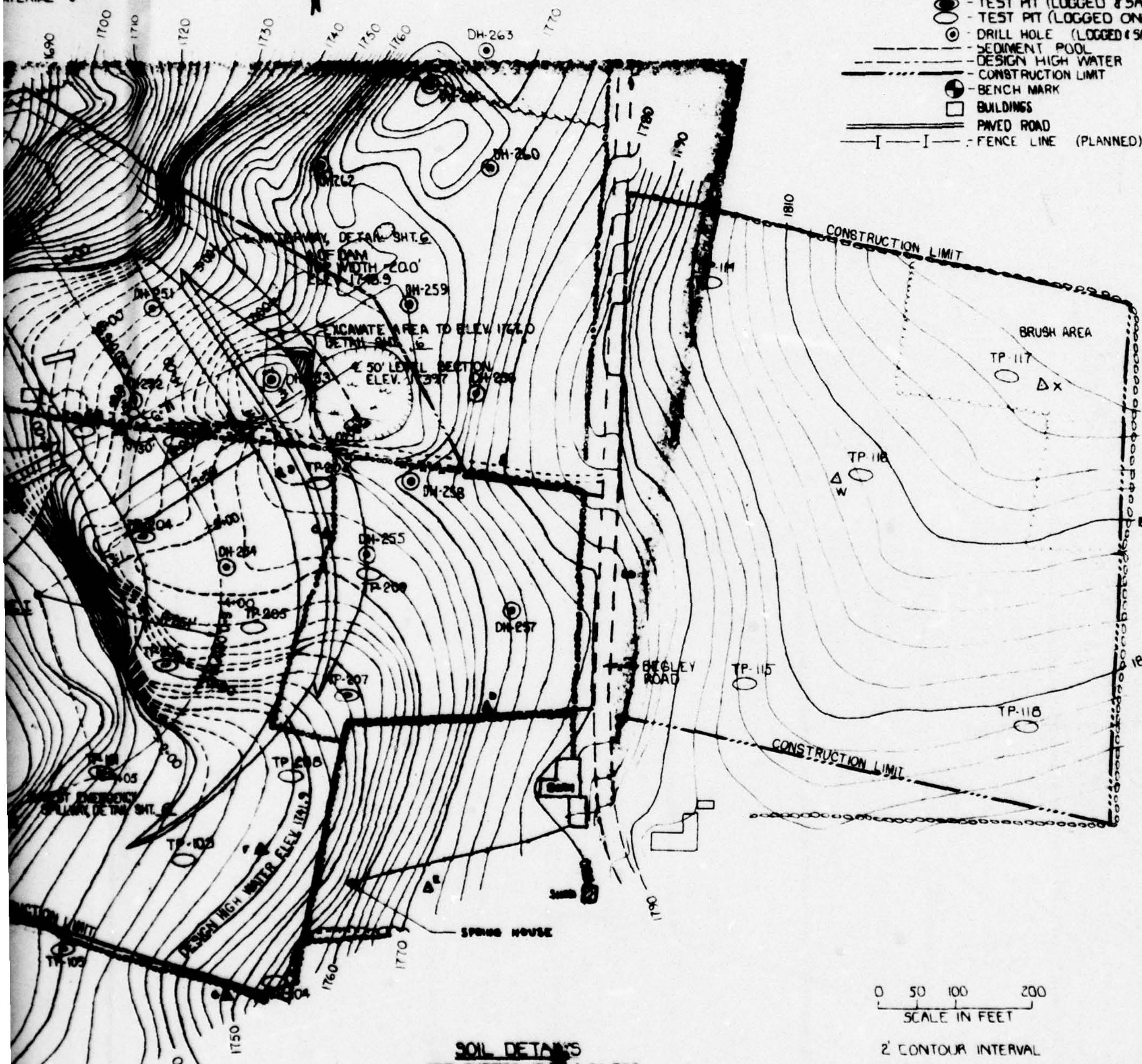
LAYOUT DATA CURVE II

Δ= 19°45' T= 50.53'
R= 290.' E= 4.37'
D= 19°45' M= 4.30'
L= 100.

℄ STATION	DEFLECTION ∢	CORD DIST.
4+04	0°00'	0.00
4+29	2°28'	24.99
4+54	4°56'	24.99
4+79	7°25'	24.99
5+04	9°53'	24.99

LEGEND

- STONE WALL
- FENCE LINE (EXISTING)
- WOODED AREA
- TRAVERCE HUB
- CENTER LINE OF STREAM
- DIRT ROAD
- POWER LINE
- TEST PIT (LOGGED & SAMPLED)
- TEST PIT (LOGGED ONLY)
- DRILL HOLE (LOGGED & SAMPLED)
- SEDIMENT POOL
- DESIGN HIGH WATER
- CONSTRUCTION LIMIT
- BENCH MARK
- BUILDINGS
- PAVED ROAD
- FENCE LINE (PLANNED)



SOIL DETAILS

SEE SHEETS 19, [illegible] & 21 FOR DESCRIPTION OF DRILL HOLES AND TEST PITS SHOWN ON SHEETS 3,4,5,6,7,[illegible] & 10

0 50 100 200
SCALE IN FEET

2' CONTOUR INTERVAL

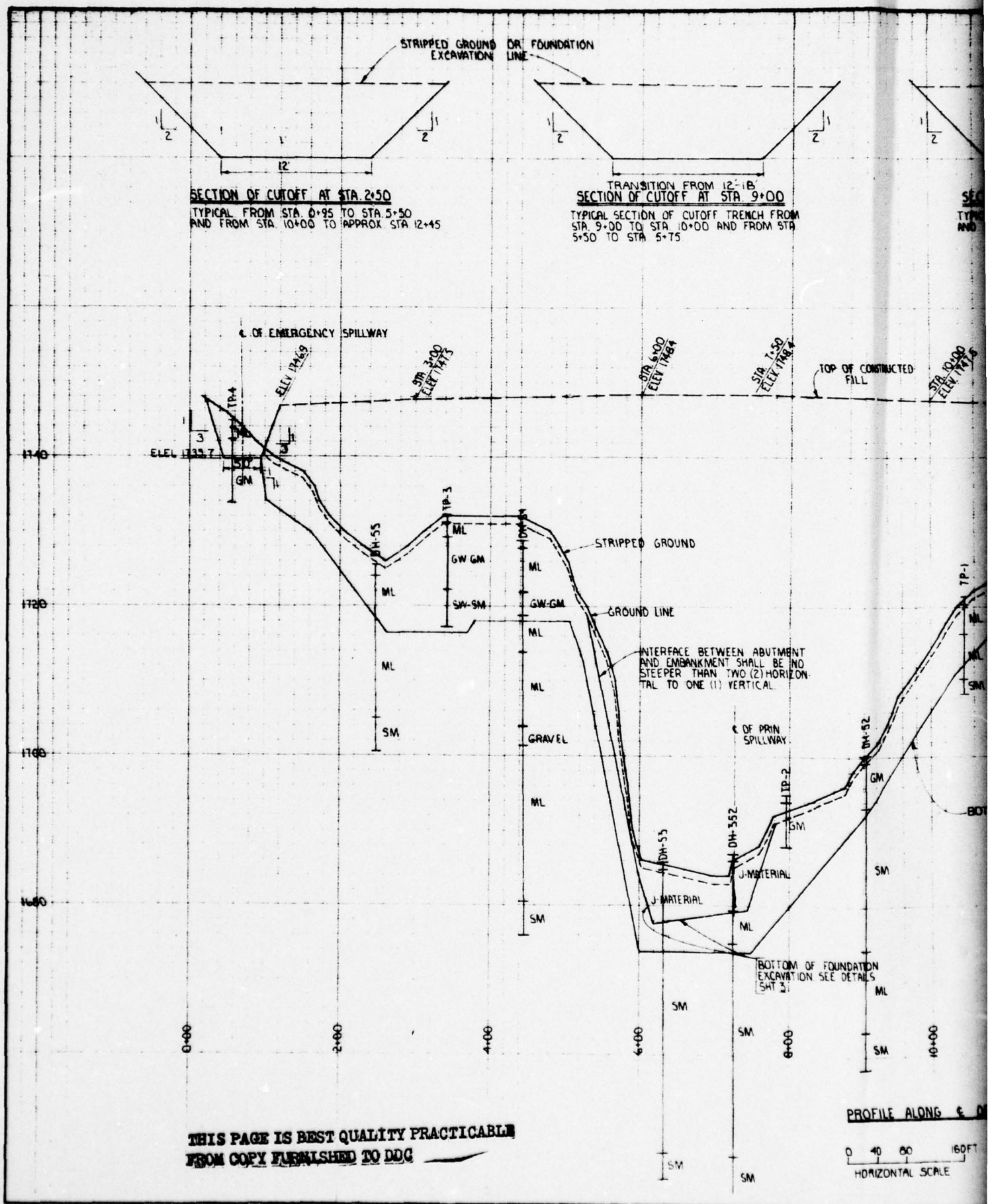
BATAVIA KILL WATERSHED
SITE 3
FLOODWATER RETARDING DAM
GREENE COUNTY, NEW YORK
PLAN OF STRUCTURAL WORKS

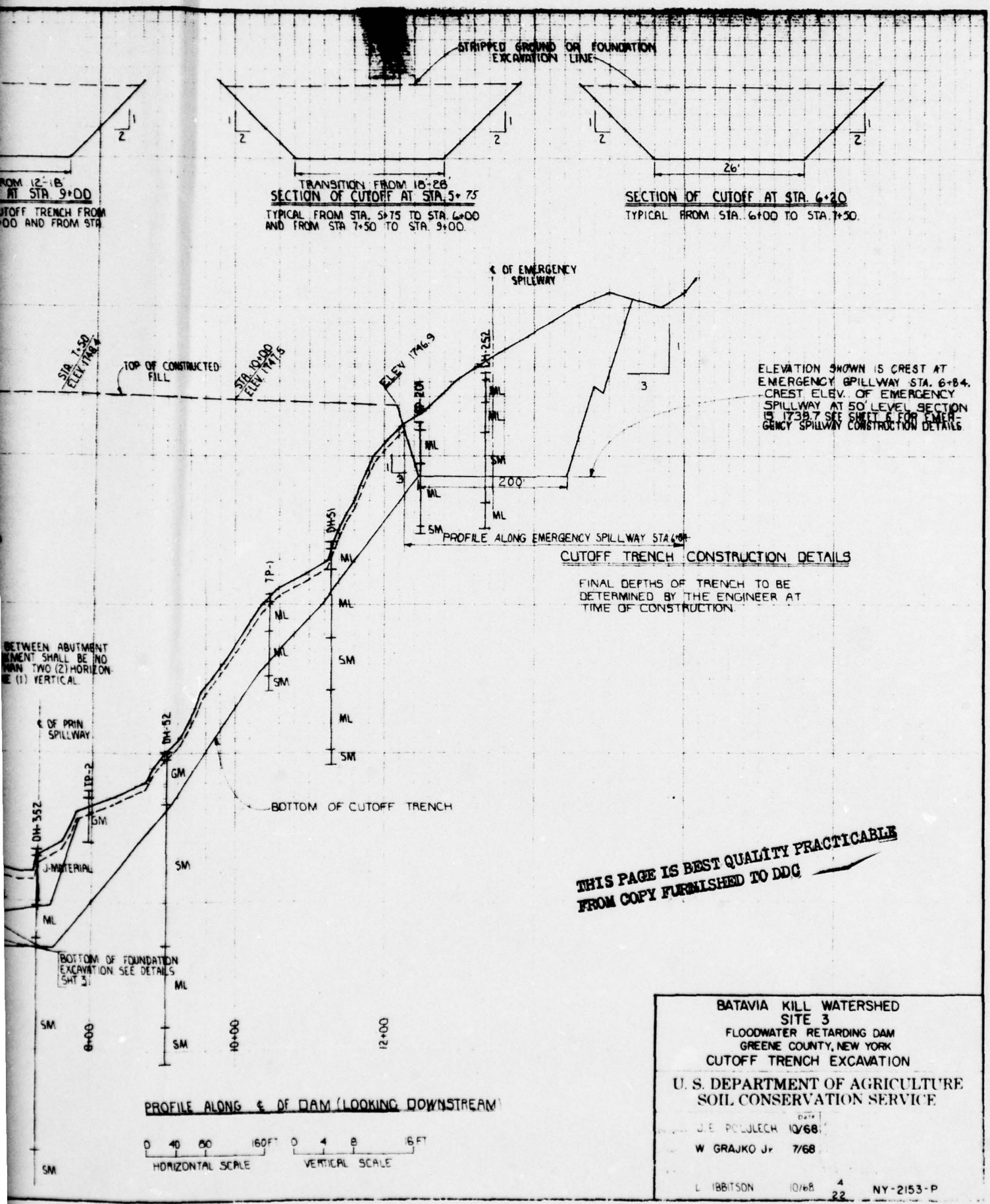
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

		Date	
Designed	J E POLULECH	11-68	Approved by
Drawn	D ANGELO	11-68	
Traced			Sheet 3 of 22
Checked	J.E.P.	4/69	Drawing No. NY-2153-P

SCS [illegible] APRIL [illegible]

2





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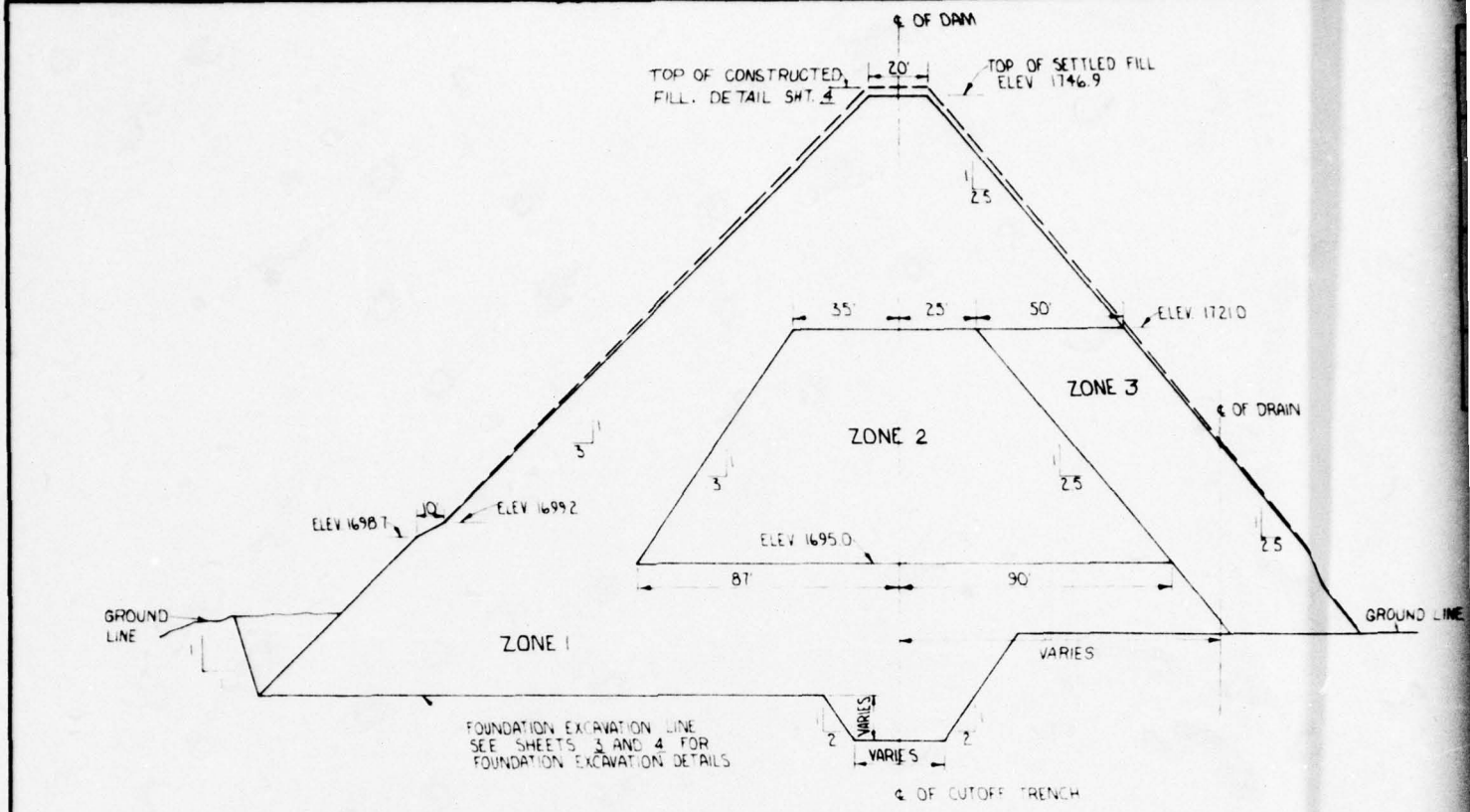
BATAVIA KILL WATERSHED
SITE 3
FLOODWATER RETARDING DAM
GREENE COUNTY, NEW YORK
CUTOFF TRENCH EXCAVATION

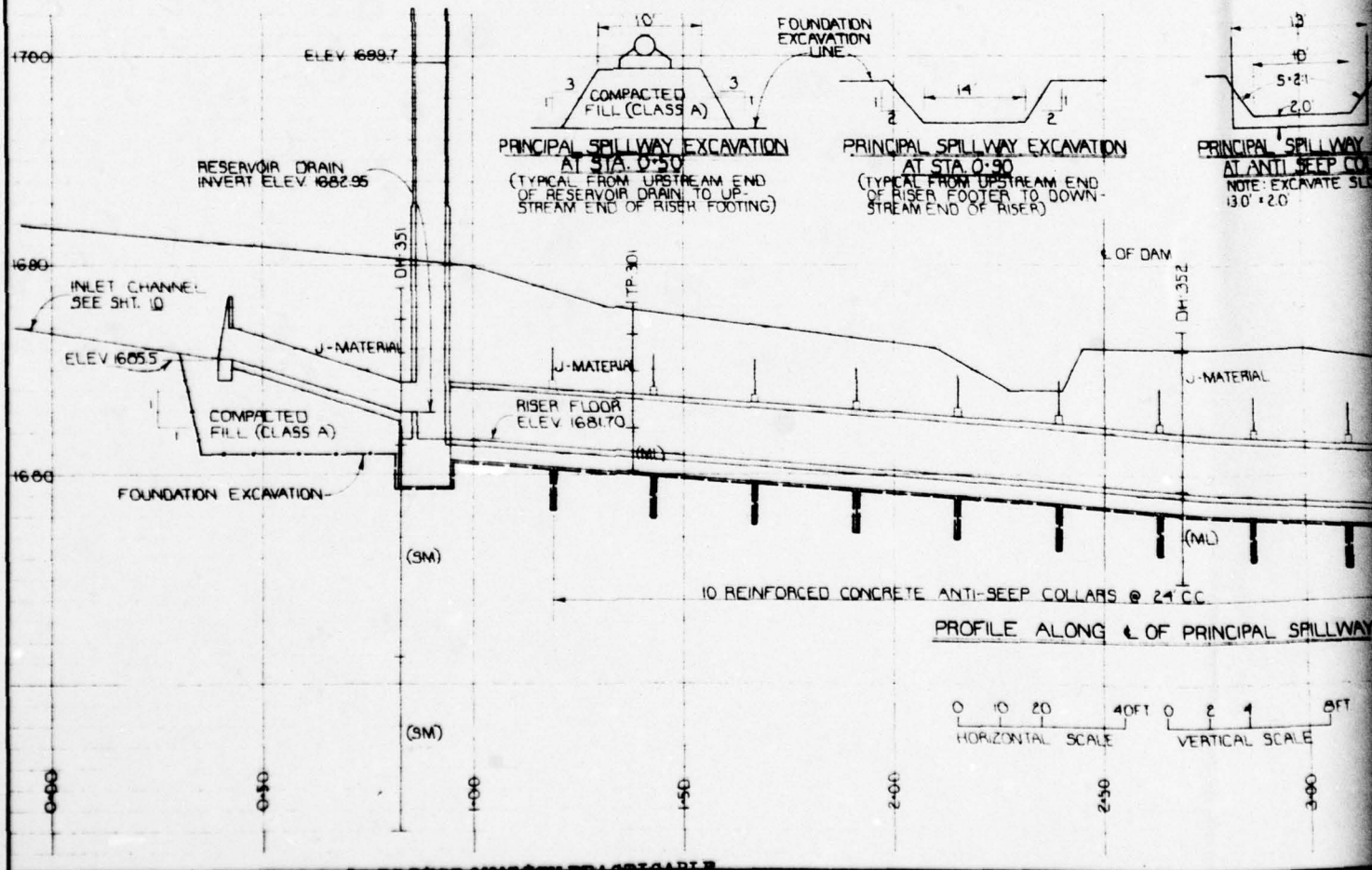
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

	Date
J. E. POLUJECH	10/68
W GRAJKO Jr	7/68
L IBBITSON	10/68

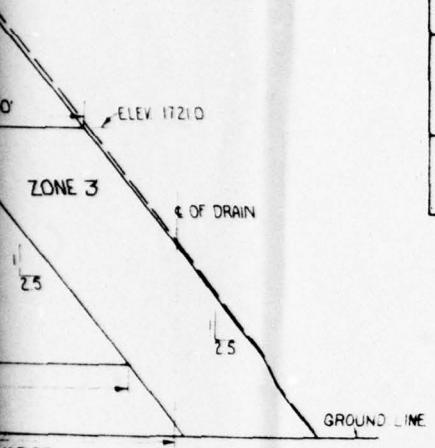
4
22

NY-2153-P





F SETTLED FILL
1746.9



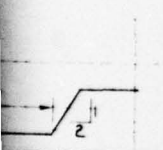
EARTH FILL REQUIREMENTS

ZONE	MATERIAL 1/	MAX. ROCK SIZE 2/	MAX. LIFT THICK 3/	MIN. REQUIRED WATER CONTENT 4/	COMPACTION 5/	
					CLASS	DEFINITION
1	MATERIALS A AND B LABELLED ON SHEET 20 AND REPRESENTED BY: TP 202 FROM 1.0' TO 8.0' TP 207 FROM 1.5' TO 10.0' TP 114 FROM 1.0' TO 9.0' TP 115 FROM 1.0' TO 9.0'	6"	9"	2 PERCENTAGE POINTS BELOW OPTIMUM	A	100% STANDARD DENSITY BY ASTM D-698 METHOD A
2	MATERIALS E AND D AS LABELLED ON SHEET 20 AND REPRESENTED BY: TP 206 FROM 1.0' TO 14.0' DH 253 FROM 10.5' TO 15.0' DH 254 FROM 6.5' TO 25.5'	6"	9"	2 PERCENTAGE POINTS BELOW OPTIMUM	A	100% STANDARD DENSITY BY ASTM D-698 METHOD A
3	MATERIALS I AND F AS LABELLED ON SHEET 20 AND REPRESENTED BY: TP 204 FROM 6.5' TO 2.5' TP 202 FROM 8.0' TO 15.0'	6	9	2 PERCENTAGE POINTS BELOW OPTIMUM	A	100% STANDARD DENSITY BY ASTM D-698 METHOD A

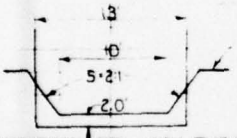
1/ SEE SHEETS 20,21, AND 22 FOR DESCRIPTION AND LOCATION OF MATERIALS A THRU F.
2/ a. MAXIMUM ROCK SIZE PLACED IN BACKFILL COMPACTED BY MEANS OF HAND TAMPING OR MANUALLY DIRECTED POWER TAMPERS OR PLATE VIBRATORS SHALL BE 3 INCHES.
b. OVERSIZE MATERIAL (6" TO 16" INCLUSIVE), FROM ZONES 1 AND 2, THAT IS NOT USED IN THE CONSTRUCTION OF THE STONE GUTTER, WILL BE UTILIZED IN THE UPSTREAM PORTION OF THE DAM IN AN AREA FROM 10 FEET TO 30 FEET FROM THE UPSTREAM FACE.
3/ MAXIMUM LIFT THICKNESS PRIOR TO COMPACTION.
4/ WATER CONTENT AT TIME OF COMPACTION.
5/ FOR TYPICAL COMPACTION CURVES SEE SHEET 22.

CONSTRUCTION DETAIL

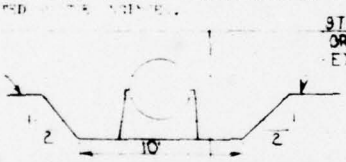
1. THE FOUNDATION AREA THROUGHOUT THE EAST AREA OF THE DAM SHALL BE SCARIFIED TO A DEPTH OF 6 INCHES AND COMPACTED PRIOR TO PLACEMENT OF MATERIAL.
2. ELEVATION 1721.0 FOR THE TOP OF ZONES 2 AND 3 IS APPROXIMATE. FINAL ELEVATION TO BE DETERMINED ON THE BASIS OF AVAILABILITY OF MATERIALS F,D,F, AND I FROM THE WEST EMERGENCY SPILLWAY EXCAVATION.
3. TOP SOIL THAT IS SUITABLE FOR USE AND NOT USED ON THE SPECIFIED AREA OF THE PRINCIPAL SPILLWAY SHALL BE INCORPORATED WITHIN THE SLOPES OF THE EARTH FILL AS DIRECTED BY THE ENGINEER.



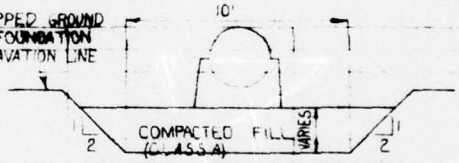
WAY EXCAVATION
50
STREAM END
ER TO DOWN-
F RISER)



PRINCIPAL SPILLWAY EXCAVATION AT ANTI SEEP COLLARS
NOTE: EXCAVATE SLOTS 3.0' x 2.0'

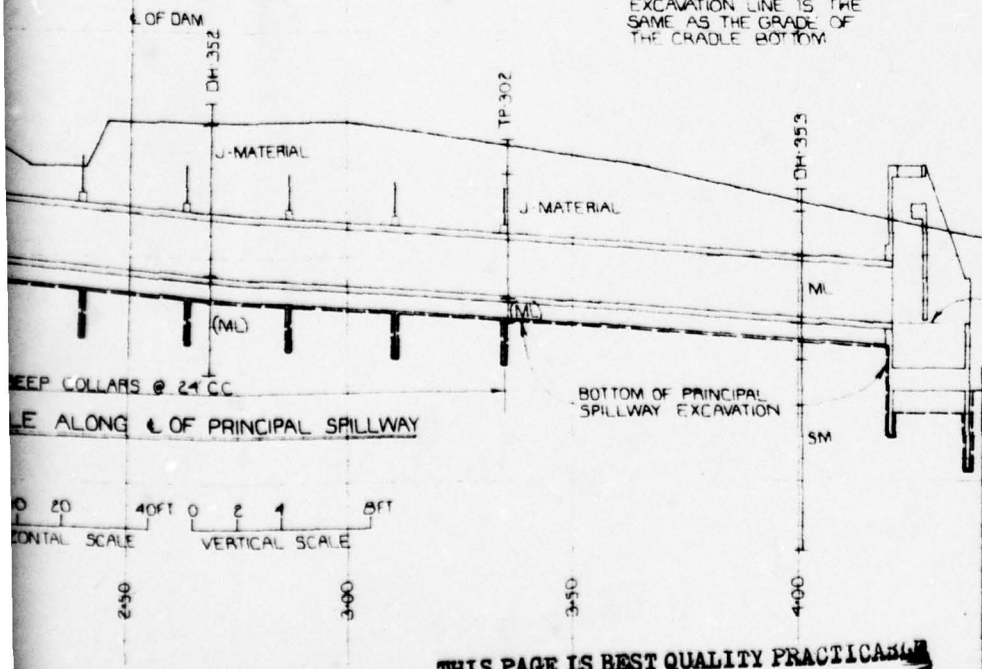


PRINCIPAL SPILLWAY EXCAVATION AT STA. 1+35
TYPICAL FROM DOWNSTREAM END OF RISER TO UPSTREAM END OF IMPACT BASIN IN AREAS WHERE THE PRINCIPAL SPILLWAY EXCAVATION LINE IS THE SAME AS THE GRADE OF THE CRADLE BOTTOM



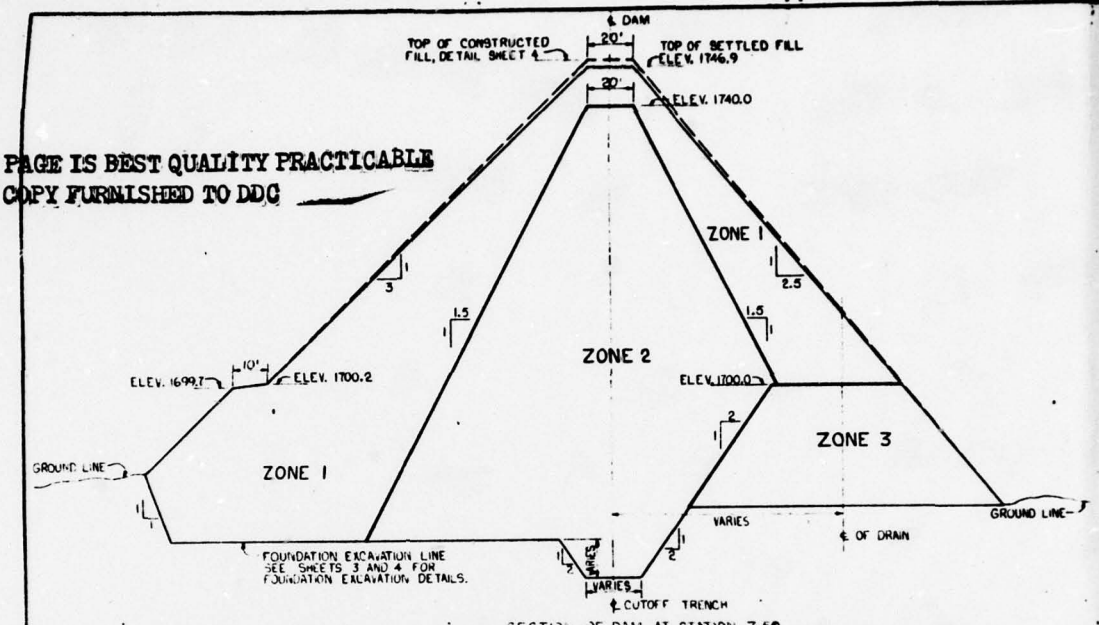
PRINCIPAL SPILLWAY EXCAVATION AT STA. 4+00
TYPICAL FROM DOWNSTREAM END OF RISER TO UPSTREAM END OF IMPACT BASIN IN AREAS WHERE THE PRINCIPAL SPILLWAY EXCAVATION LINE IS BELOW THE GRADE OF THE CRADLE BOTTOM

CONSTRUCTION DETAIL
J" MATERIAL TO BE THOROUGHLY REMOVED ALONG ENTIRE LENGTH OF PRINCIPAL SPILLWAY EXCAVATION

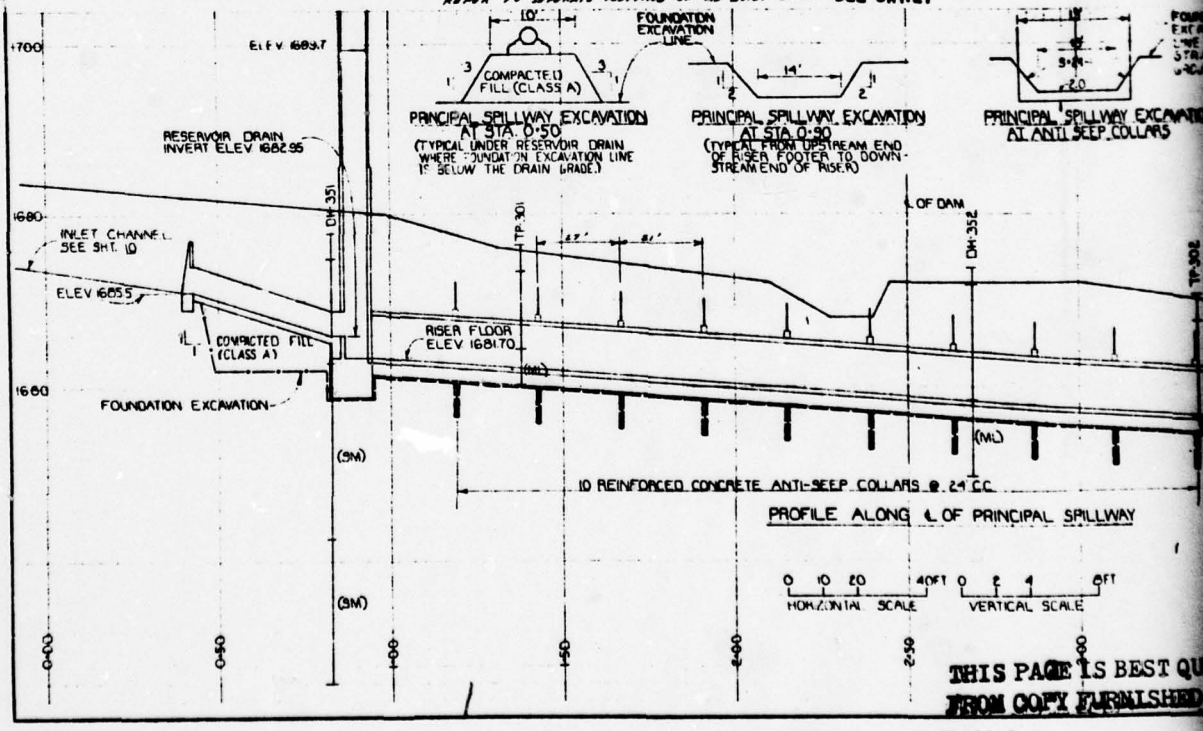


BATAVIA KILL WATERSHED
SITE 3
FLOODWATER RETARDING DAM
GREENE COUNTY, NEW YORK
FILL PLACEMENT & PRIN. SPWY. EXCAV.
U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

DESIGNED	J.E. POLULECH	1968
DRAWN	N.E. SPRAGUE JR.	
TRACED	J. DE VITA III	1968
CHECKED		
SHEET NO. 7 OF 22		NY-2153-D


DAM
TOP OF CONSTRUCTED FILL, DETAIL SHEET
TOP OF SETTLED FILL ELEV. 1746.9
20'
ELEV. 1740.0
ZONE 1
ZONE 2
ZONE 3
3
1.5
2.5
2
ELEV. 1699.7
10'
ELEV. 1700.2
ELEV. 1700.0
GROUND LINE
VARIES
℄ OF DRAIN
FOUNDATION EXCAVATION LINE
SEE SHEETS 3 AND 4 FOR FOUNDATION EXCAVATION DETAILS.
VARIES
℄ CUTOFF TRENCH

SECTION OF DAM AT STATION 7+50
(TYPICAL FROM APPROX. STA. +90 TO APPROX. STA. 12+18)
REFER TO SEPARATE PLOTTING OF AS BUILT ZONES SEE SHT. 27



EARTH FILL REQUIREMENTS

ZONE	MATERIAL 1/	MAX 2/ ROCK SIZE	MAX 3/ LIFT THICK	MINIMUM REQUIRED WATER CONTENT 4/	COMPACTION 6/	
					CLASS	DEFINITION
1	Materials A and B labelled on sheet 20 and represented by: TP 202 from 1.0' to 8.0' TP 213 From 1.5' to 11.0' TP 114 From 1.0' to 9.0' TP 115 From 1.0' to 9.0'	18"	24"	The water control of the material passing the 3/4" sieve shall be not less than 5 percent nor greater than percent, unless modified in the field by the engineer at the time of construction.		See Construction Specification 5
2	Represented by material in zone 1 plus materials and as labelled on sheet 20 and represented by TP 236 From 1.0' to 14.0' DH 251 From 10.5' to 15.' DH 254 From 6.5' to 25.5'	6		percentage points below optimum	A	100% standard density by ASTM D-698 Method A
3	Material as labelled on sheet 20 represented by TP 311 From 1.5' to 6.0' DH 351 From 1.5' to 7.5'	12	1	Wet 5/		See Construction Specification 5

1/ The placement table indicates estimated use of material. Materials I and as labelled on sheet 2 and represented by: 234 from 5.5' to 12.5' and 232 from 8.0' to 15.0' will be utilized in the downstream section of zones 2 and 3.

2/a. Maximum rock size placed in backfill compacted by means of hand tamping or manually directed power tampers or plate vibrators shall be 3".

b. Oversize material (greater than 6"), from zone 2, that is not used in the construction of the stone gutter will be utilized in zones and 3.

c. Oversize material (greater than 6") is to be graded within zones 1 and 3, so that the larger rocks are placed toward the outside slopes. Oversize material will not be exposed on the outside slopes.

3/ Maximum lift thickness prior to compaction.

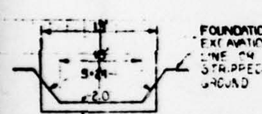
4/ Water content at time of compaction.

5/ Thoroughly wet but not so wet as to cause adherence of the soil to the wheels or tracks of equipment, nor to cause bogging down of equipment.

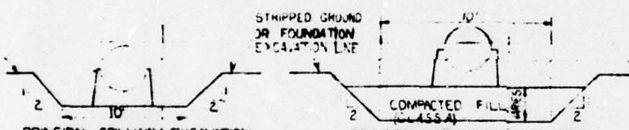
6/ For typical compaction curves see sheet 22.

CONSTRUCTION DETAILS

1. The foundation surface throughout the base area of the dam shall be scarified to a depth of 6 inches and compacted prior to placement of material.
2. Zone boundaries indicated are approximate. Adjustments will be made by the engineer to permit the contractor to utilize all useable required excavation within the neat lines of the embankment.
3. Topsoil that is suitable for use and not used in the specified area of the emergency spillway shall be incorporated within the slopes of the earth fill as directed by the engineer.



PRINCIPAL SPILLWAY EXCAVATION AT ANTI SEEP COLLARS



PRINCIPAL SPILLWAY EXCAVATION AT STA 1+35

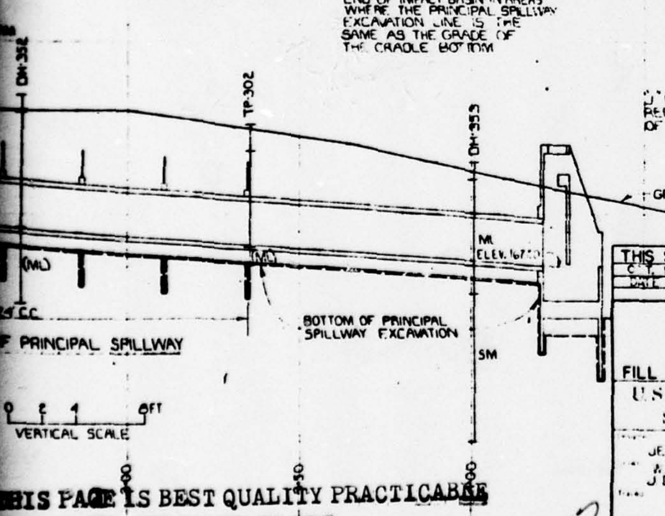
TYPICAL FROM DOWNSTREAM END OF RISER TO UPSTREAM END OF IMPACT BASIN IN AREAS WHERE THE PRINCIPAL SPILLWAY EXCAVATION LINE IS THE SAME AS THE GRADE OF THE CRADLE BOTTOM

PRINCIPAL SPILLWAY EXCAVATION AT STA 4+00

TYPICAL FROM DOWNSTREAM END OF RISER TO UPSTREAM END OF IMPACT BASIN IN AREAS WHERE THE PRINCIPAL SPILLWAY EXCAVATION LINE IS BELOW THE GRADE OF THE CRADLE BOTTOM

CONSTRUCTION DETAIL

"J" MATERIAL TO BE THOROUGHLY REMOVED ALONG ENTIRE LENGTH OF PRINCIPAL SPILLWAY EXCAVATION



AS BUILT

1/27/71

THIS SHEET REVISED BY ADDENDUM #2

	EARTH FILL REQUIREMENTS	
DATE	ITEM	APP'D
	REVISIONS	

BATAVIA KILL WATERSHED
SITE 3
FLOODWATER RETARDING DAM
GREENE COUNTY, NEW YORK
FILL PLACEMENT & PRIN. SPWY. EXCAV.

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

J.E. POLULECH 11-68
W.E. GRAHAM JR
J. DE VITA III 11-68

7
22

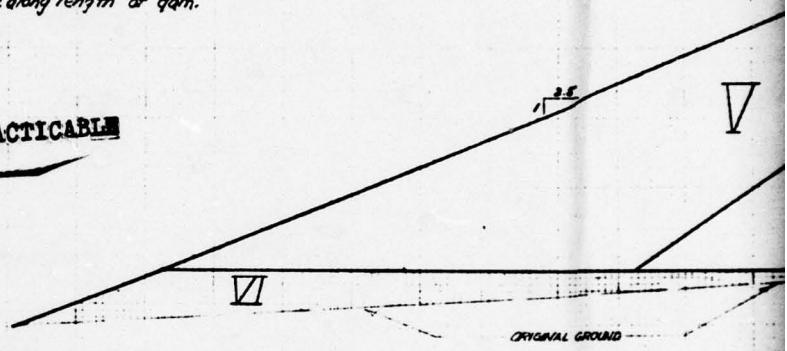
NY-2153-D

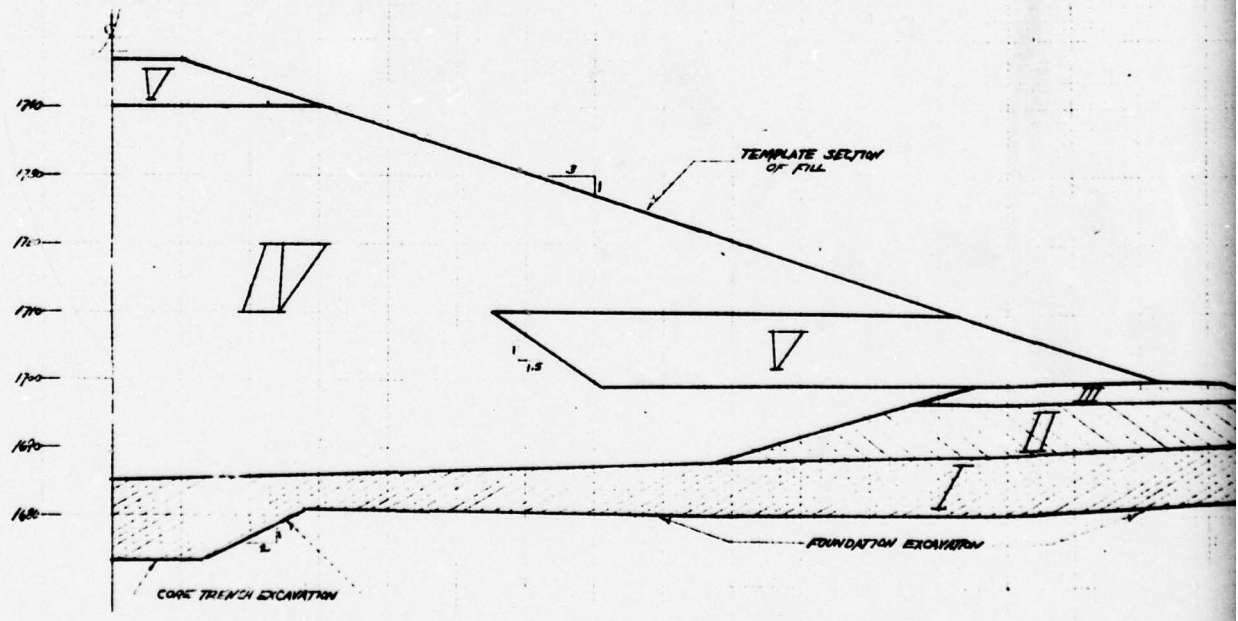
LEGEND

AREA I – Placed under Zone 2 Specs; material A
AREA II – Placed under Zone 1 Specs; material A with some D+E
AREA III – Placed under Zone 2 Specs; material A with increasing D+E
AREA IV – Placed under Zone 2 Specs; material B, D, +E.
AREA V – Placed under Zone 1 Specs; material B
AREA VI – Placed under Zone 3 Specs.; material J

NOTE

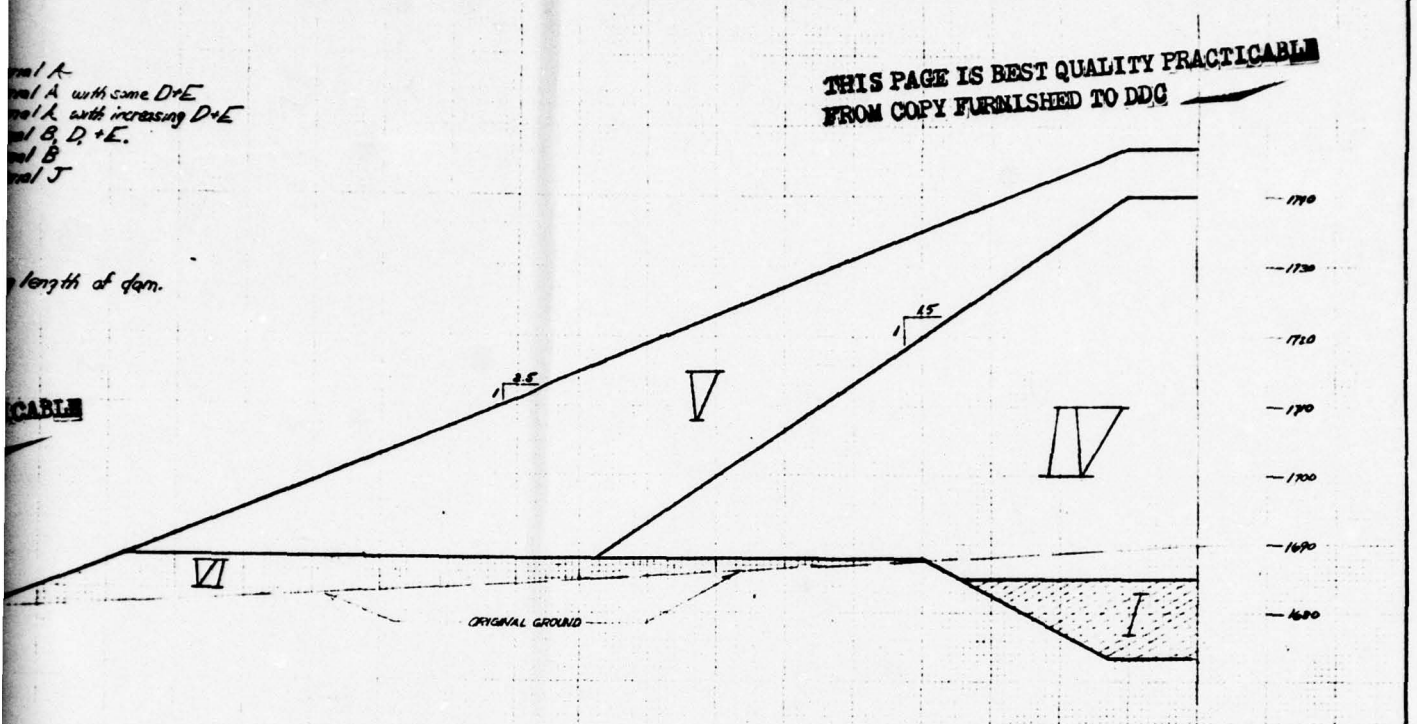
OUTLINED AREAS Only approximate along length of dam.

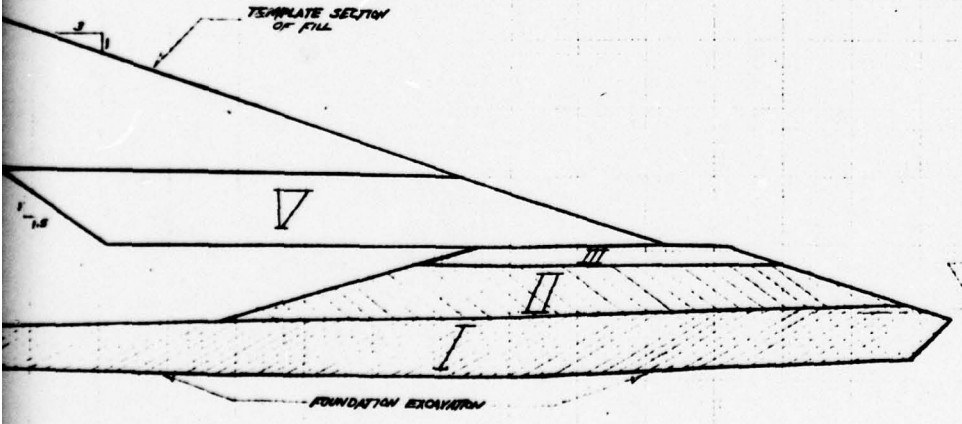




...al A
...al A with same D+E
...al A with increasing D+E
...al B, D, +E.
...al B
...al J

...length of dam.





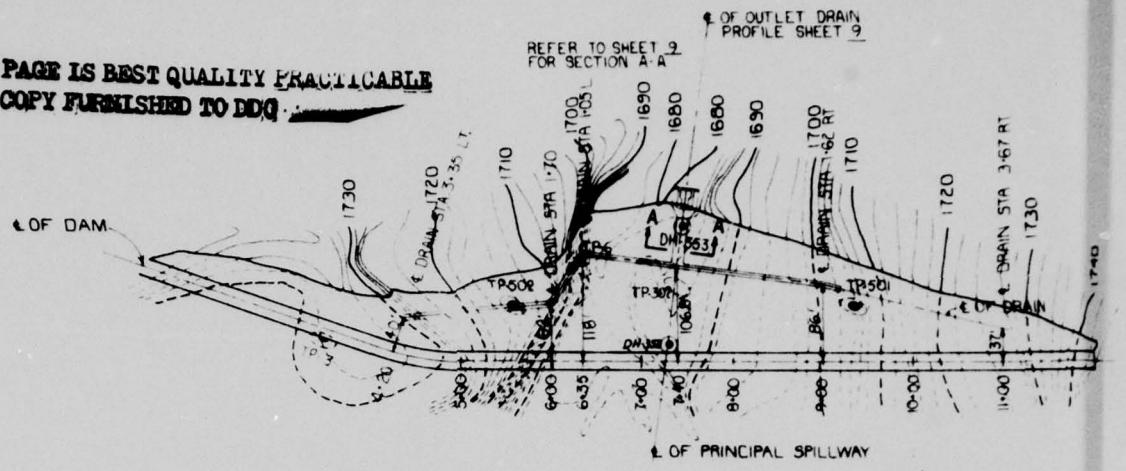
AS BUILT
1/29/71

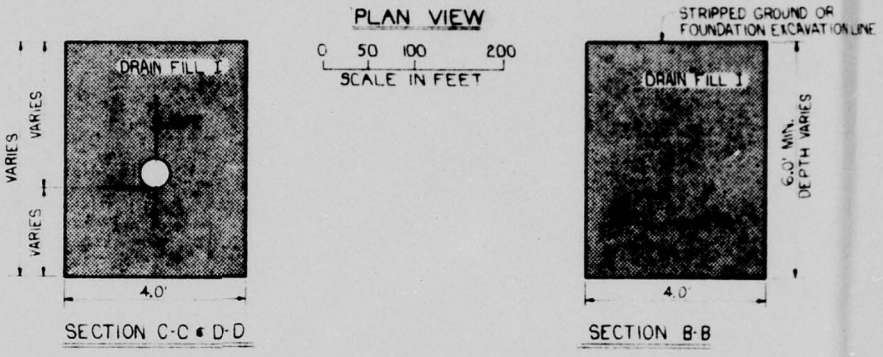
EARTH FILL ZONES - AT STA 7+50
BATAVIA KILL - SITE 3

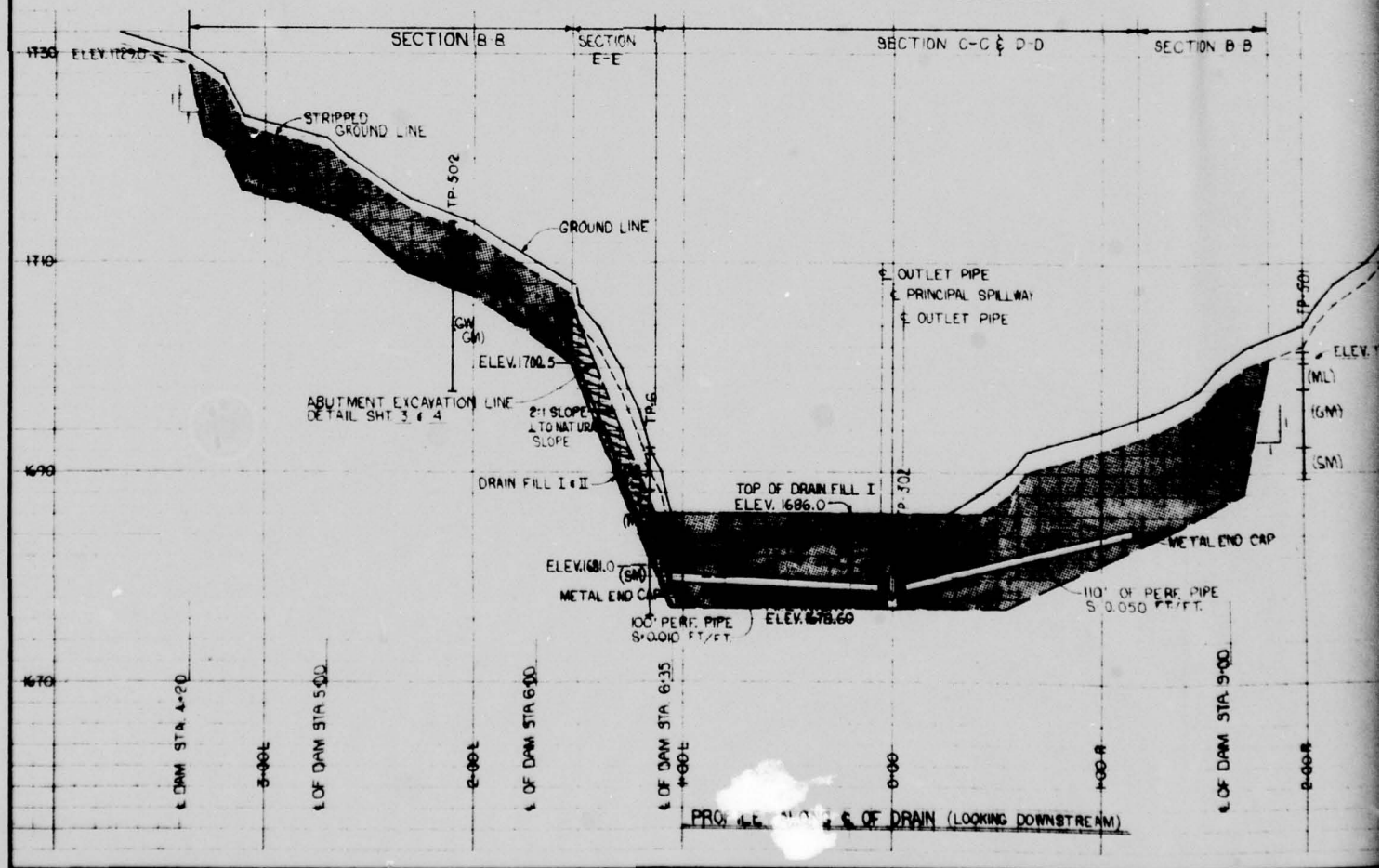
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Designed ... Date ... Approved by ...
Drawn ... Title ...
Traced ... Title ...
Checked ... Sheet 3 ... Drawing No. NY-215

SCS-ENG-315 Rev 8-69





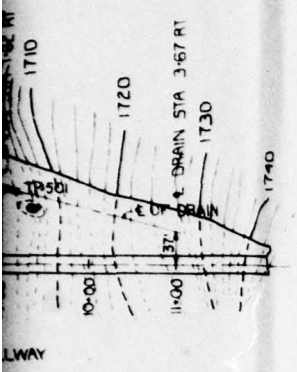


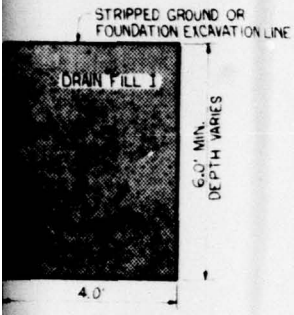
DRAINAGE SYSTEM DETAILS

1. ALL DRAIN PIPE SHALL CONFORM TO SPEC. 110 AND SHALL BE 10" DIA., SHAPE I CLASS I (ANNULAR CORRUGATIONS), OR CLASS II (HELICAL CORRUGATIONS); TYPE A (FULLY BITUMINOUS COATED) PIPE.
2. USE A MINIMUM OF 12" OF DRAIN FILL AROUND PIPE.
3. THE PROFILES AT THE BOTTOM OF ALL EXCAVATIONS AS SHOWN ARE ONLY APPROX. THE REQUIRED FINISHED GRADES WILL BE ESTABLISHED IN THE FIELD AT TIME OF CONSTRUCTION BY THE ENGINEER.

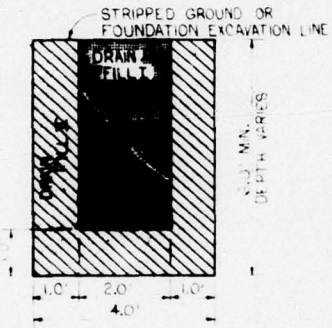
QUANTITY SUMMARY

	CU. YDS. DRAIN FILL I
	CU. YDS. DRAIN FILL II
338	LIN. FT. 10" PERFORATED PIPE
2	METAL END CAPS
4	90° ELBOWS 10" DIA. (3 PIECE)
4	30° ELBOWS 10" DIA. (2 PIECE)

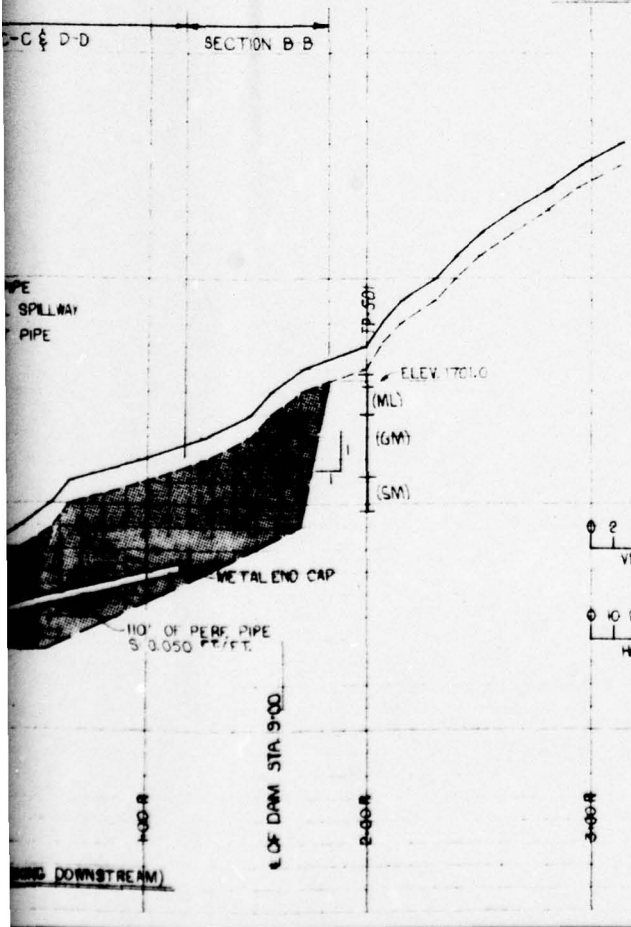




SECTION B-B



SECTION E-E

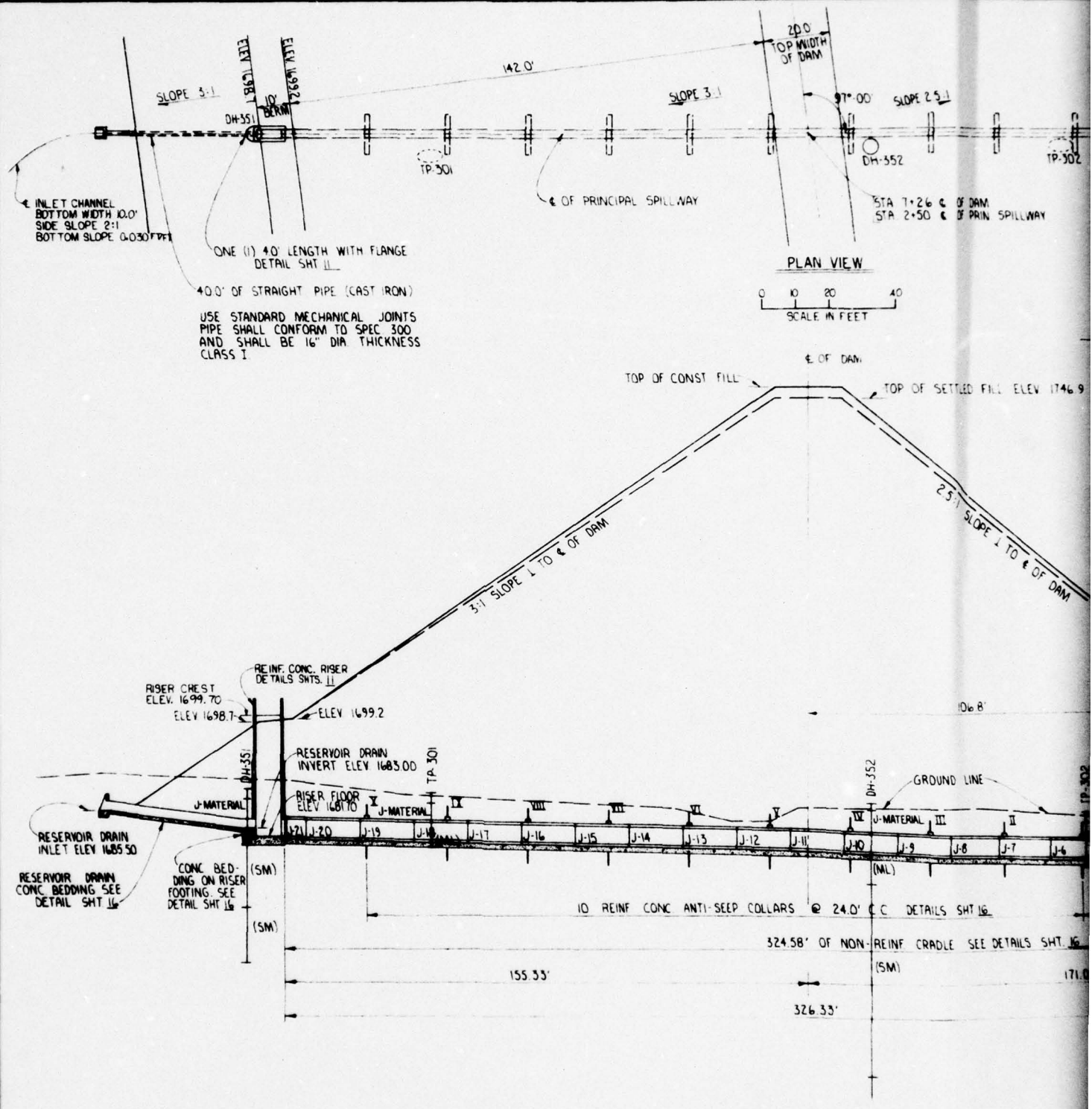


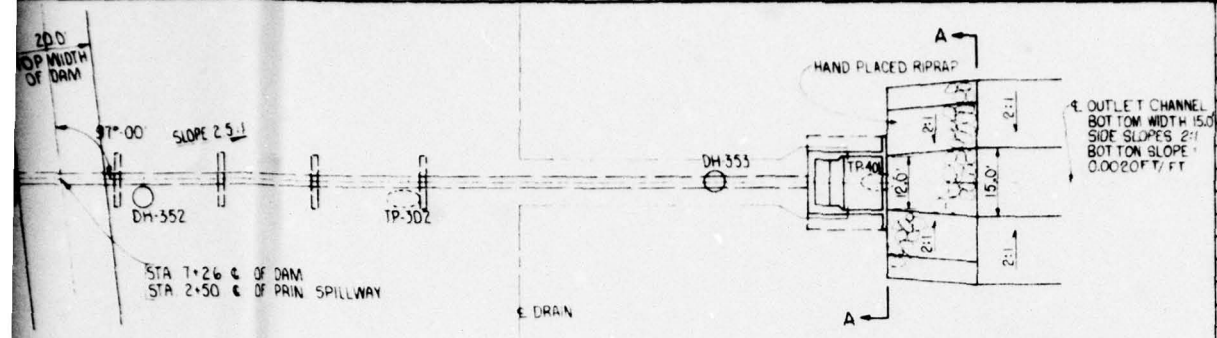
BATAVIA KILL WATERSHED
SITE 3
FLOODWATER RETARDING DAM
GREENE COUNTY, NEW YORK
DRAINAGE SYSTEM DETAILS

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Designed U.E. POLULECH	Date 10/68	Approved by Title	
Drawn D. ANGELO	11/68	Title	
Traced			
Checked U.E.P. D.C. CHAPMAN	4/69 1/70	Sheet No. 8 of 22	Drawing No. NY-2153-P

Form SCS-317 (November 1955)





PLAN VIEW

10 20 40
SCALE IN FEET

JOINT	DIST FROM OUTLET	INVERT OF 30" DIA PIPE	SLOPE
OUTLET	0	1677.00	0.01127
J-1	16	1677.28	
J-2	32	1677.55	
J-3	48	1677.83	
J-4	64	1678.11	
J-5	80	1678.38	
J-6	96	1678.66	
J-7	112	1678.93	
J-8	128	1679.21	
J-9	144	1679.49	
J-10	160	1679.76	
J-11	176	1680.04	↓
J-12	192	1680.22	
J-13	208	1680.39	
J-14	224	1680.57	
J-15	240	1680.75	
J-16	256	1680.93	
J-17	272	1681.10	
J-18	288	1681.28	
J-19	304	1681.46	
J-20	320	1681.63	
J-21	326	1681.70	0.01107

ABOVE DIMENSIONS FOR LENGTHS OF PIPE ARE BASED ON NOMINAL LENGTHS AND DO NOT INCLUDE CREEP

COLLAR	DIST FROM OUTLET	INVERT OF 30" DIA PIPE
I	86	1678.49
II	110	1678.90
III	134	1679.31
IV	158	1679.73
V	182	1680.11
VI	206	1680.37
VII	230	1680.64
VIII	254	1680.90
IX	278	1681.17
X	302	1681.43

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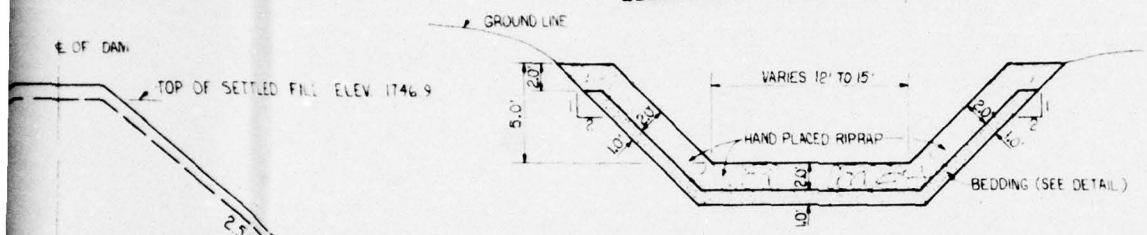
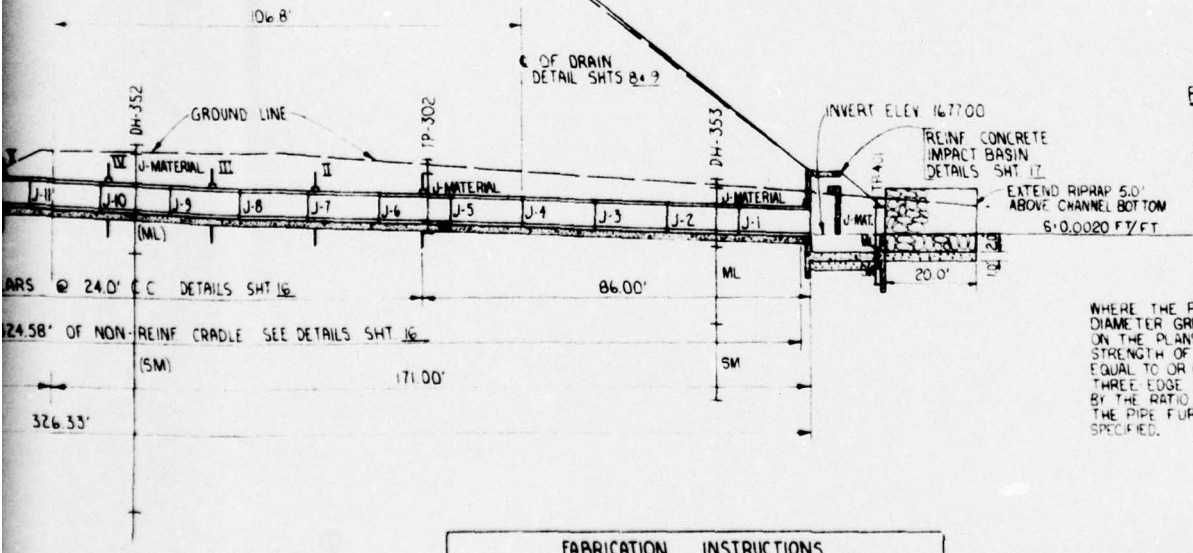


SECTION A-A

RIPRAP DETAILS

ALL RIPRAP SHALL BE GRADED FROM A MAX. SIZE OF 12" TO A MIN. SIZE OF 3". A MAXIMUM OF 20% SHALL BE LESS THAN 6" (≈ 1 LB.) AND A MAX. OF 50% SHALL BE LESS THAN 12" (≈ 50 LB.).

BEDDING SHALL MEET THE GRADATION REQUIREMENTS FOR DRAIN FILL I AS SHOWN ON SHEET 2



30" REINFORCED CONCRETE PIPE STRENGTH REQUIREMENTS

1. PRESSURE HEAD 64 FT
2. LOAD 50,217 LBS PER LIN FT BASED ON O.D OF 3.11 FT.
3. MIN 3 EDGE BEARING STRENGTH FOR 0.001" CRACK 12,317 LBS PER LIN FT FOR PRESTRESSED PIPE (AWWA C-301)

WHERE THE PIPE FURNISHED HAS AN OUTSIDE DIAMETER GREATER THAN THAT CALLED FOR ON THE PLANS, THE THREE-EDGE BEARING STRENGTH OF THE PIPE FURNISHED MUST BE EQUAL TO OR GREATER THAN THE SPECIFIED THREE-EDGE BEARING STRENGTH MULTIPLIED BY THE RATIO OF THE OUTSIDE DIAMETER OF THE PIPE FURNISHED TO THE OUTSIDE DIAMETER SPECIFIED.

ALONG ℄ OF PRINCIPAL SPILLWAY

40 FT 0 5 10 20 FT
VERT SCALE

FABRICATION INSTRUCTIONS		
(20) 16.0' SECTIONS (1) 6.0' SECTION ONE (1) SPIGOT RING WALL FITTING FOR 18" WALL	OR	(116) 20.0' SECTIONS (1) 6.0' SECTION ONE (1) SPIGOT RING WALL FITTING FOR 18" WALL
PIPE SUPPLIERS NOTE CAST OUTSIDE OF SPIGOT RING WITH CONCRETE ON ONE 16.0' SECTION		PIPE SUPPLIERS NOTE CAST OUTSIDE OF SPIGOT RING WITH CONCRETE ON ONE 20.0' SECTION

WHEN PIPE IS SUPPLIED IN 20.0' LENGTHS THE ENGINEER WILL PROVIDE THE CONTRACTOR WITH A REVISION OF THIS SHEET SHOWING ORDER OF INSTALLATION AND PIPE INVERT ELEVATIONS

BATAVIA KILL WATERSHED
SITE 3
FLOODWATER RETARDING DAM
GREENE COUNTY, NEW YORK
PLAN PROFILE OF PRINCIPAL SPILLWAY
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

DESIGNED	J.E. POLULECH	DATE 10/68	
DRAWN	W.E. GRAJKO JR	10/68	
TRACED			
CHECKED	D.C. CHAPMAN	1/69	10 22 NY-2153-P

SCS-ENG-APRIL 1963

MATERIAL DESCRIPTIONS

A

Silt-sandy, trace to 5% gravel, 20-25% well graded sand, rest fines, brown, slightly moist, moderately permeable (k = 2.1 ft./day), medium to hard (N = 5-78, average 28 blows/ft), derived from till through weathering and erosion. Sample 4.1 (ML)

B

Gravel-silty, trace to 10% +6" material (some boulders), 35-40% gravel, 30% sand, 30-40% slightly plastic fines, red-brown, moist, relatively impermeable, dense to very dense (N = 33-84, average 57 blows/ft.), glacial till.
Samples: 501.1, 109.1, 207.1 (GM)

C

Gravel-sandy, trace of +6" material, 50-55% gravel, 35-40% sand, rest fines, occurs as interbedded sands and gravels w/occasional silt seams, brown, moist, moderately permeable (one test only, 2.4 ft./day), dense (N = 30-72 blows/ft), outwash. (GW-GM)
Samples: 3.1, 502.1

D

Silt-sandy, occasional +6" material, 5-10% gravel, 25-30% sand, 60-65% non-plastic silt, occurs as interbedded silts, sands, and gravels - description is a composite sample, brown, moist to saturated, moderately permeable (k = 0.0-21.4 averaging 3.0 ft./day), compact (N = 10-75, average 37 blows/ft), glacial lacustrine. Sample 105.1 (ML)

E

Silt-clayey, occasional pieces of gravel, 10-15% fine and very fine sand; rest non-plastic fines, brown, moist, slightly permeable (k = 0.2-2.8 ft/day), firm (N = 17-39, average 30 blows/ft), glacial lacustrine.
Sample 206.1 (ML)

F

Sand-silty, trace of +6" material, 15% gravel, 60-65% well graded sand, 20-25% non-plastic fines; brown, moist, moderate permeability, compact (N = 27-118 average 53 blows/ft.), possible lacustrine. Sample 204.1 (SM)

G

Sand-silty, brown, moist, moderately plastic, relatively impermeable, hard (n = 53-190, average 113 blows/ft), glacial till. (SM)
Composite sample G

H

Sand-gravelly, 40-45% gravel, 45-50% sand, 15% fines, brown, moist, moderate to rapid permeability (k = 0.2-8.8 average 4.6 ft./day), very dense (N = 29-100, average 51 blows/ft.), valley fill deposit. Sample 501.2 (SM)

I

Sand-gravelly, 30-35% gravel, 55-60% sand, 10% non-plastic fines, brown, moist, moderate permeability, firm, outwash. (SW-SM)
Sample 503.1

J

Recent alluvium - gravel - sandy, 5% +6" material, loose, rapid permeability, test holes cave badly and rapidly fill with water.

K

Topsoil, loose - organic matter, some stones and boulders - reddish-brown - permeable - average depth 1.0'.

BACKHOE PIT LOGS

TP #1, C/L Elev. 1721.4

0	1.0	Material K		
1.0	5.0	"	A	(ML)
5.0	11.0	"	D	(ML)
11.0	13.0	"	H	(SM)

TP #2, C/L Elev. 1694.9

0	1.0	Material K - v. stony		
1.0	7.0	"	B	(GM)

TP #3, C/L Elev. 1732.2

0	1.0	Material K		
1.0	3.0	"	A	(ML)
3.0	10.0	"	C	(GW-GM) D.S. 3.1
10.0	15.0	"	I	(SW-SM) D.S. 3.2

TP #4, C/L Elev. 1744.8

0	1.0	Material K		
1.0	2.5	"	A	(ML) D.S. 4.1
2.5	11.0	"	B	(GM) D.S. 4.2

TP #5, C/L Elev. 1724.4

0	1.0	Material K		
1.0	5.0	"	I	(SW-SM)
5.0	11.5	"	C	(GW-GM) D.S. 5.1

TP #6, C/L Elev. 1692.3

0	0.5	Rubble		
0.5	4.0	Material E		(ML)
4.0	9.0	"	D	(ML)
9.0	16.0	"	H	(SM)

TP #101, Borrow Area, Elev. 1724.9

0	1.0	Material K		
1.0	4.0	"	B	(GM)
4.0	12.5	"	D	(ML)
		D.S. 101.1: 5.5'-5.7'		
12.5+		Hole caving badly		

W.L. 9.0' est. 9/29/67

TP #102, Borrow Area, Elev. 1713.4

0	1.0	Material K		
1.0	5.5	"	B	(GM)
5.5	10.5	"	D	(ML)

W.L. 8.0' est. 9/29/67

TP #103, Borrow Area, Elev. 1733.8

0	1.0	Material K		
1.0	3.0	"	B	(GM)
3.0	12.5	"	D	(ML)

TP #104, Borrow Area, Elev. 1754.7

0	1.0	Material K		
1.0	9.0	"	B	(GM)

NOTE: Boulder & oversize count show 6-10%.

TP #105, Borrow Area, Elev. 1731.4

0	1.0	Material K		
1.0	3.5	"	A	(ML)
3.5	6.0	"	B	(GM)
6.0	15.5	"	D	(ML) D.S. 105.1, @ 10.5'
15.5	16.0	"	G	(possibly) (SM)

TP #106, Borrow Area, Elev. 1728.5

0	1.0	Material K		
1.0	5.0	"	B	(GM)
5.0	13.0	"	D	(ML)

TP #107, Borrow Area, Elev. 1744.1

0	1.0	Material K		
1.0	8.0	"	B	(GM)
8.0	12.0	"	D	(ML) D.S. 107.1, 9.5'

NOTE: Sample of silt only.

TP #108, Borrow Area, Elev. 1738.7

0	1.0	Material K		
1.0	6.0	"	B	(GM)
6.0	12.5	"	D	(ML)

TP #109, Borrow Area, Elev. 1750.1

0	1.0	Material K		
1.0	10.0	"	B	(GM) D.S. 109.1, 10.0'

NOTE: Digging v. difficult.

TP #110, Borrow Area, Elev. 1726.1

0	1.0	Material K		
1.0	4.5	"	B	(GM)
4.5	12.0	"	D	(ML)

TP #111, Borrow Area, Elev. 1766.6

0	1.5	Material K		
1.5	12.0	"	B	(GM)

NOTE: Digging v. difficult.

TP #114, Borrow Area, Elev. 1801.7

0	1.0	Material K		
1.0	9.0	"	B	(GM) D.S. 114.1

NOTE: Slightly stonier below 7.0'.

TP #115, Borrow Area, Elev. 1791.5

0	1.0	Material K		
1.0	9.0	"	B	(GM) D.S. 115.1, 10.0'

NOTE: Slightly stonier below 7.0'.

TP #116, Borrow Area, Elev. 1808.2

0	1.0	Material K		
1.0	13.0	"	B	(GM)

NOTE: Slightly stonier below 7.0'.

TP #117, Borrow Area, Elev. 1816.7

0	1.0	Material K		
1.0	10.0	"	B	(GM)

NOTE: Slightly stonier below 7.0'.

TP #118, Borrow Area, Elev. 1797.8

0	1.0	Material K		
1.0	10.0	"	B	(GM)

NOTE: Slightly stonier below 7.0'.

TP #201, Emer. Spillwy., Elev. 1744.5

0	1.0	Material K		
1.0	5.5	"	A	(ML)
5.5	14.0	"	E	(ML)
14.0	15.0	"	F	(SM)

TP #107, Borrow Area, Elev. 1744.1

0	1.0	Material K		
1.0	8.0	"	B	(GM)
8.0	12.0	"	D	(ML) D.S. 107.1, 9.5'

NOTE: Sample of silt only.

TP #108, Borrow Area, Elev. 1738.7

0	1.0	Material K		
1.0	6.0	"	B	(GM)
6.0	12.5	"	D	(ML)

TP #109, Borrow Area, Elev. 1750.1

0	1.0	Material K		
1.0	10.0	"	B	(GM) D.S. 109.1, 10.0'

NOTE: Digging v. difficult.

TP #110, Borrow Area, Elev. 1726.1

0	1.0	Material K		
1.0	4.5	"	B	(GM)
4.5	12.0	"	D	(ML)

TP #111, Borrow Area, Elev. 1760.6

0	1.5	Material K		
1.5	12.0	"	B	(GM)

NOTE: Digging v. difficult.

TP #114, Borrow Area, Elev. 1801.7

0	1.0	Material K		
1.0	9.0	"	B	(GM) D.S. 114.1

NOTE: Slightly stonier below 7.0'.

TP #115, Borrow Area, Elev. 1791.5

0	1.0	Material K		
1.0	9.0	"	B	(GM) D.S. 115.1, 10.0'

NOTE: Slightly stonier below 7.0'.

TP #116, Borrow Area, Elev. 1808.2

0	1.0	Material K		
1.0	13.0	"	B	(GM)

NOTE: Slightly stonier below 7.0'.

TP #117, Borrow Area, Elev. 1816.7

0	1.0	Material K		
1.0	10.0	"	B	(GM)

NOTE: Slightly stonier below 7.0'.

TP #118, Borrow Area, Elev. 1797.9

0	1.0	Material K		
1.0	10.0	"	B	(GM)

NOTE: Slightly stonier below 7.0'.

TP #201, Emer. Spillwy., Elev. 1744.5

0	1.0	Material K		
1.0	5.5	"	A	(ML)
5.5	14.0	"	E	(ML)
14.0	15.0	"	F	(SM)

TP #202, Emer. Spillwy., Elev. 1758.6

0	1.0	Material K		
1.0	8.0	"	A	(ML)
8.0	15.0	"	I	(SW-SM)

TP #203, Emer. Spillwy., Elev. 1766.3

0	1.0	Material K		
1.0	6.0	"	A	(ML)
6.0+		Refusal on boulders		

TP #204, Emer. Spillwy., Elev. 1759.1

0	1.0	Material K		
1.0	6.5	"	A	(ML)
6.5	12.5	"	F	(SM) D.S. 204.1

TP #205, Emer. Spillwy., Elev. 1754.6

0	1.0	Material K		
1.0	16.0	"	E	(ML)

TP #206, Emer. Spillwy., Elev. 1751.1

0	1.0	Material K		
1.0	14.0	"	E	(ML) D.S. 206.1

TP #207, Emer. Spillwy., Elev. 1748.6

0	1.5	Material K		
1.5	10.0	"	B	(GM) D.S. 207.1 @ 6.0'.

TP #208, Emer. Spillwy., Elev. 1740.2

0	1.5	Material K		
1.5	8.5	"	B	(GM)

TP #209, Emer. Spillwy., Elev. 1761.0

0	1.5	Material K		
1.5	9.0		B	(GM)

TP #301, Prin. Spillwy., Elev. 1688.2

0	1.5	Material K		
1.5	6.0	"	J	
6.0	8.0	"	D	(ML)

NOTE: Hole filling rapidly w/water and caving badly.

TP #302, Prin. Spillwy., Elev. 1685.2

0	1.5	Material K		
1.5	7.0	"	J	
7.0	8.0	"	D	(ML)

NOTE: Hole filling rapidly w/water and caving badly.

TP #401, Stream Channel, Elev. 1681.0

0	1.0	Material K		
1.0	4.0	"	J	
4.0	5.5	"	D	(ML)
5.5	9.5	"	H	(SM)

NOTE: Hole caving badly w/water entering rapidly.

WL est. @ 3.0' 9/28/67.

TP #501, Drain Line, Elev. 1701.5

0	1.0	Material K		
1.0	3.5	"	A	(ML)
3.5	9.0	"	B	(GM) D.S. 501.1 @8.0'
9.0	12.0	"	H	(SM) D.S. 501.2 @9.5'

TP #502, Drain Line, Elev. 1713.9

0	1.0	Material K		
1.0	3.0	"	A	(ML)
3.0	16.0	"	C	(GW-GM) D.S. 502.1 @9.0'

TP #503, Drain Line, Elev. 1728.1

0	1.0	Material K		
1.0	4.0	"	A	(ML)
4.0	7.0	"	I	(SW-SM) D.S. 503.1 @5.0'
7.0	12.0	"	C	(GW-GM) D.S. 503.2 @12.0'

DRILL HOLE LOGS

DH #51, C/L, Elev. 1728.5

	0.0	
		Material K
	1.0	
5		
6		Material A (ML)
8		
	3.8	
16		
19		
19		Material D (ML)
15		
10		
66		
	14.0	
29		
72		Material H (SM)
68		
	20.0	
32		
91		
75		Material D (ML)
42		
38		
113		
	28.0	
85		Material G (SM)
	30.0	

WL Dry ; 11/13/67
NOTE: Hole caved below 14.7'

DH #52, C/L, Elev. 1700.2

	0.0	
3		Material K
	1.0	
33		
54		
84		Material B (GM)
58		
	7.0	
35		
43		
45		
49		
43		
37		
35		Material H (SM)
36		
34		
58		
67		
37		
	26.0	
31		
39		
30		
31		Material D (ML)
27		
40		
58		
58		
	37.0	
76		
33		Material G (SM)
92		
	42.0	

WL 13.7'- 10/31/67; 12.8'- 11/13/67.
NOTE: Hole caved below 13.5'.

BATAVIA KILL WATERSHED
SITE 3
FLOODWATER RETARDING DAM
GREENE COUNTY, NEW YORK
LOGS OF TEST HOLES

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Designed Harold C. Page 11/67
Drawn
Traced
Checked
Approved [signature]
STATE CONS. ENGR.

Sheet No. 20 of 22 Sheets
Drawing No. NY-2153-P

SCS-313C (9-64)

8

DH #253, C/L, Elev. 1695.8

2	0.0	Material K
	1.0	
10		Material J
26		
46		
53		NOTE: Trace of Material D @ 7.5'-8.5'.
36	8.0	
53		Material M (SM)
46		
50		
47		
38		
59		NOTE: Slightly more fines below 24.3'.
52		
49		
	39.0	
100		
100/.5		Material G (SM)
	42.5	

WL @1.0'; 11/13/67.

DH #254, C/L, Elev. 1728.8

4	0.0	Material K
	1.0	
14		
22		
17		Material A (ML)
26		
	7.0	
30		
72		Material C (GW-GM)
	10.0	
37		
27		Material D (ML)
38		
	15.0	
30		
35		
26		
22		Material E (ML)
36		
29		
36		
	27.0	
46		Gravel Zone
		NOTE: Very permeable zone.
	27.5	
22		
35		
29		
17		Material E (ML)
RB	40.8	
61		
64		Material M (SM)
	53.0	

WL Dry; 11/13/67
NOTE: Hole caved below 26.5'.

DH #255, C/L, Elev. 1725.2

5	0.0	Material K
	1.5	
42		
69		
36		Material A (ML)
	6.5	
22		
68		
30		
55		
23		Material D (ML)
34		
36		NOTE: Grades into till near
31		bottom of zone;
53		no rec. 15.0-19.5'.
40		
	28.5	
36		
68		Material M (SM)
100/.5		
	25.8	

WL - None taken.
NOTE: Some till like structure observed at 24.0'.

DH #256, C/L, Elev. 1720.2

8	0.0	Material K
	1.0	
38		
78		Material A (ML)
43		
	5.3	
36		
27		Material D (ML)
25		
36		
48		
	13.0	
47		
35		Material M (SM)
RB		NOTE: Clean gravel zone @24.8-25.3'.
39		WL - None taken.
	25.5	

DH #251, Emer. Spillwy., Elev. 1747.8

14	0.0	Material K
	1.0	
39		
58		Material A (ML)
73		
44		
48		
44		
	10.5	
18		
17		Material D (ML)
25		
	15.0	

WL - 5.4'; 10/20/67.
5.4'; 10/23/67.

NOTE: Hole caved below 6.0'.

DH #252, Emer. Spillwy., Elev. 1751.2

11	0.0	Material K
	1.0	
40		Material A (ML)
20		
	4.0	
27		
22		Material E (ML)
	8.0	
27		
42		
37		
91		Material F (SM)
64		
72		
48		
	17.5	
45		Material E (ML)
57		
	21.0	

WL - dry 10/20/67.

NOTE: Hole caved below 15.5'.

DH #253, Emer. Spillwy., Elev. 1771.4

14	0.0	Material K
	1.0	
39		
46		Material A (ML)
	5.0	
17		
14		Material I (SW-SM)
RB		
	8.6	
24		
25		
63		
111		Material F (SM)
118		
32		
37		
32		
39		
	24.3	
39		
23		Material E (ML)
45		
	33.5	

WL - None taken.

NOTE: Hole caved below 4.5'.

DH #254, Emer. Spillwy., Elev. 1761.5

8	0.0	Material K
	1.5	
15		
38		
38		Material A (ML)
	6.5	
25		
22		
27		Material E (ML)
25		
15		
19		
13		
13		
	25.5	
25		Material G (SM)
	27.0	

WL - None taken.

DH #255, Emer. Spillwy., Elev. 1761.5

	0.0	Material K
	1.5	
RB		
115		Material B (GM)
	13.0	
23		
25		
24		Material E (ML)
25		
23		
22		
190/.5		
	22.5	
WR		Boulder
		Material G (SM)
150/.5		
52		
	28.0	

WL @2.6'; 10/23/67.

NOTE: Hole caved below 8.5'.

DH #256, Emer. Spillwy., Elev. 1776.5

9	0.0	Material K
	1.5	
134		
91/.5		Material B (GM)
	5.5	
51		
36		Material F (SM)
	13.3	
48		
48		
62		Material G (SM)
39		
60		
	36.5	

WL @9.4'; 10/18/67.

NOTE: Hole caved below 9.5'.

DH #257, Emer. Spillwy., Elev. 1773.9

17	0.0	Material K
	1.5	
44		
150/.8		Material B (GM)
	13.8	
60		Material F (SM)
	17.4	
81		
32		Material G (SM)
56		
	34.6	
RB		Sandstone
WR		
	41.0	

WL @6.0'; 10/23/67.

NOTE: Hole caved below 11.3'.

254, Emer. Spillwy., Elev. 1761.5

Depth	Material
0.0	Material K
1.5	Material A (ML)
6.5	Material E (ML)
25.5	Material G (SM)
27.0	

WL - None taken.

255, Emer. Spillwy., Elev. 17[illegible].5

Depth	Material
0.0	Material K
1.5	Material B (GM)
13.0	Material E (ML)
22.5	Boulder Material G (SM)
28.0	

WL @2.6'; 10/23/67.

NOTE: Hole caved below 8.5'.

256, Emer. Spillwy., Elev. 1776.5

Depth	Material
0.0	Material K
1.5	Material B (GM)
5.5	Material F (SM)
13.3	Material G (SM)
36.5	

WL @9.4'; 10/18/67.

NOTE: Hole caved below 9.5'.

, Emer. Spillwy., Elev. 1773.9

Depth	Material
0.0	Material K
1.5	Material B (GM)
13.8	Material F (SM)
17.4	Material G (SM)
34.6	Sandstone
41.0	

WL @6.0'; 10/23/67.

NOTE: Hole caved below 11.3'.

BH #351, Prin. Spillwy., Elev. 1688.9

Blows	Depth	Material
7	0.0	Material K
23, 46, 39, 19	1.5	Material J
32, 28, 24, 43, 150/.7, 63	7.5	Material H (SM) NOTE: Some till like zones.
12[illegible]/.5, 1[illegible]7, 100/.3	17.5	Material G (SM)
	25.8	

WL @8.2'; 11/13/67

BH #352, Prin. Spillwy., Elev. 1686.9

Blows	Depth	Material
5	0.0	Material K
8, 19, 25, 23	1.0	Material J
37, 28, 34	7.6	Material D (ML)
28, 36, 37, 73, 44, 44, 58, 38, 33, 37, 32, 34, 142/.7, 43, 67, 60, 96, 38	12.0	Material H (SM)
146/.5, RB, 175/.6, 150/.4, 100/.2	40.5	Boulder Material G (SM)
NX	56.0	Sandstone
	61.0	

WL - 2.7'; 11/6/67.
3.2'; 11/13/67.

BH #353, Prin. Spillwy., Elev. 1683.0

Blows	Depth	Material
17	0.0	Material K
11, 29, 25, 22	1.0	Material J
21, 86/.6, NX, 25, 48	7.5	Boulder Material D (ML)
60, 27, 88, 111, 163/.7, 59/.5	16.0	Material H (SM) NOTE: Some till like zones present.
	24.5	

WL @1.3'; 11/6/67.
1.5'; 11/13/67.

LOGS OF TEST HOLES

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

NY-2[illegible]-P

DH #259, Emergency Spillway, Elev. 1770.2

0.0
5 Material K
1.0
9 Material A (ML)
3.0
60/.3
RB Material B (GM)
46 Boulders 3.8-5.1
33 5.1-5.8
25 Poor rec. 9.0-10.5
10.0
18 Material E (ML)
33
13.3
49 Material F (SM)
19
17.0
18 Material E (ML)
12 v. soft 18.5-19.5
54
21.9
34
35 Material G (SM)
88
Aug
41.0
WL 4.9', 4/10/68. Hole caved below 8.7'

DH #259, Emergency Spillway, Elev. 1766.7

0.0
8 Material K
1.0
Material A (SM)
20/.1 Boulder 2.1-3.0
3.0
RB
RB Material D (ML)
7.0
23
RB Material E (ML)
146 Boulder 8.9-12.0
28 Occasional 3" sand zones
46
26
20.5
55 Material F (SM)
90 Note apparent free water
63 at 20.4'
24.6
67
RB Material G (SM)
RC
35.0
WL Dry, 4/10/68.
Hole caved below 11.0'

DH #260, Emergency Spillway, Elev. 1772.4

0.0
8 Material K
1.0
57
RB Material A (ML)
117 Boulder 3.5-4.0
RB Cobble 5.7-6.0
6.0
41
46 Material D (ML)
54
RB
14.0
85/.3
RB
70 Material C (SM)
RB
34 Boulder 14.8-16.0, 17.6-18.5,
59 18.5-22 reworked till w/some
109 silt layers
136
101
71
RC
50.0
WL 10.0', 4/10/68
Hole caved below 15.5'

DH #261, Emergency Spillway, Elev. 1781.1

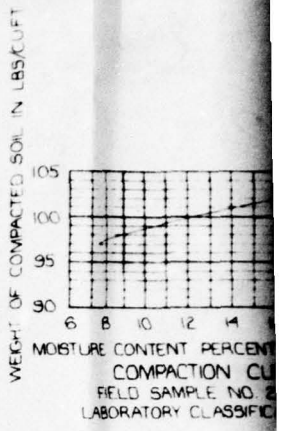
0.0
20 Material K
1.0
15 Material A (ML)
2.5
20
18
19 Material F (SM)
13
20 Mostly gravel - 28.0-30.0
32 Boulder 30.7-32.0
25
47
38
51
57
44
76
120/.2
RB
64
35.0
29
31 Material E (ML)
14
41
41.0
37
31 Material D (ML)
23
48.5
34 Material G (SM)
34 Soft near top
133
55.0
WL dry, 4/10/68,
Hole caved below 34.0

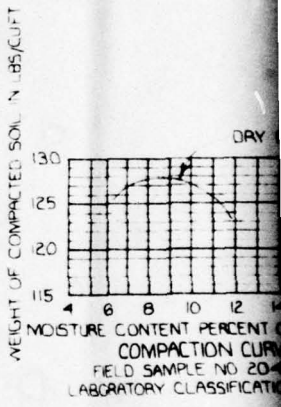
DH #262, Emergency Spillway, Elev. 1770.1

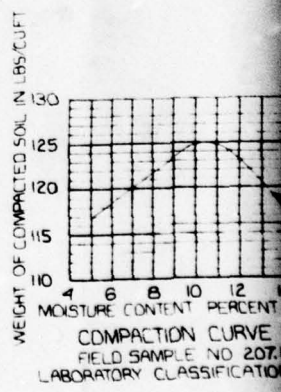
0.0
11 Material K
1.0
41
4.5 Material A (ML)
38
Material D (ML)
30
39
8.8
25
6e Material F (SM)
47 Numerous gradation variations
35 in samples
33
20.0
34
20
48
35
43 Material E (ML)
32
RB
49
RB
28
RB
46.5
19 Material G (SM)
AUG
47.0
WL dry, 4/10/68.
Hole caved below 5.5'

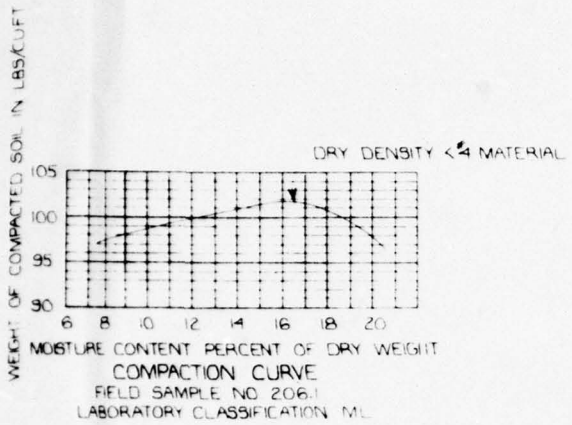
DH #263, Emergency Spillway, Elev. 1769.0

0.0
6 Material K
1.0
Material A (ML)
1.5
74
RB
28 Material F (SM)
56 Boulder 4.0-5.8
10.0
8
12
29
11 Material E (ML
23 Free water 19.0'
22
RB
29
26.0
37
48 Material F (SM)
48
31.0
34
65 Material G (SM)
58
76
AUG
45.0
WL - none taken

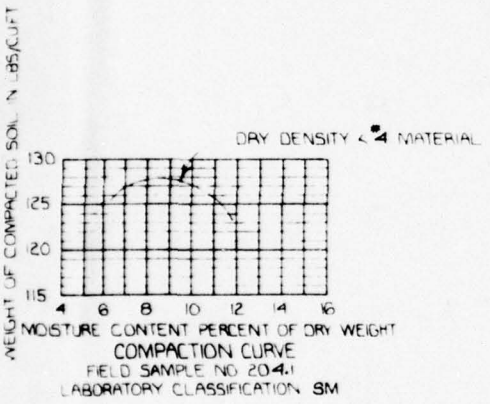




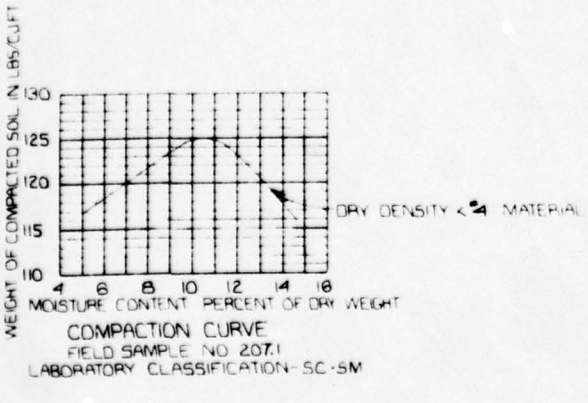




COMPACTION CURVE
FIELD SAMPLE NO 206-1
LABORATORY CLASSIFICATION ML



COMPACTION CURVE
FIELD SAMPLE NO 204-1
LABORATORY CLASSIFICATION SM



COMPACTION CURVE
FIELD SAMPLE NO 207-1
LABORATORY CLASSIFICATION SC-SM

BATAVIA KILL WATERSHED
SITE 3
FLOODWATER RETARDING DAM
GREENE COUNTY, NEW YORK
LOGS OF TEST HOLES

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

RONALD C. PAGE 11/67

22
22

NY-2153-P

BATAVIA KILL SITE NO. 3 MM

EMBANKMENT AND FOUNDATION INPUT DATA

	FIRST POINT X	FIRST POINT Y	SECOND POINT X	SECOND POINT Y	DENSITY IN LBS/CU.FT.	SHEAR PARAMETERS ABOVE LINE PHI	C	BELOW PHI
LINE 1	-30.0	-7.2	-10.0	0.0	138.0	0.0	0.	36.0
LINE 2	-10.0	0.0	10.0	0.0	138.0	0.0	0.	36.0
LINE 3	10.0	0.0	155.0	-62.0	138.0	0.0	0.	36.0
LINE 4	-144.0	-48.2	-30.0	-7.2	-141.8	0.0	0.	36.0
LINE 5	-154.0	-48.2	-144.0	-48.2	-141.8	0.0	0.	36.0
LINE 6	-194.0	-62.0	-154.0	-48.2	-141.8	0.0	0.	36.0
LINE 7	-30.0	-7.2	107.0	-62.0	-141.8	36.0	300.	36.0
LINE 8	107.0	-62.0	155.0	-62.0	-141.8	36.0	300.	0.0
LINE 9	107.0	-62.0	-194.0	-62.0	-141.8	36.0	300.	0.0
LINE 10	-194.0	-62.0	-1000.0	-62.0	-141.8	0.0	0.	0.0
LINE 11	155.0	-62.0	1000.0	-62.0	-141.8	0.0	0.	0.0

11X14

Pg 5-1

****

ANKMENT AND FOUNDATION INPUT DATA

****

SECOND POINT X	Y	DENSITY IN LBS/CU.FT.	SHEAR PARAMETERS ABOVE LINE PHI	C	BELOW LINE PHI	C
-10.0	0.0	138.0	0.0	0.	36.0	300.
10.0	0.0	138.0	0.0	0.	36.0	300.
155.0	-62.0	138.0	0.0	0.	36.0	300.
-30.0	-7.2	-141.8	0.0	0.	36.0	300.
-144.0	-48.2	-141.8	0.0	0.	36.0	300.
-154.0	-48.2	-141.8	0.0	0.	36.0	300.
107.0	-62.0	-141.8	36.0	300.	36.0	300.
155.0	-62.0	-141.8	36.0	300.	0.0	0.
-194.0	-62.0	-141.8	36.0	300.	0.0	0.
1000.0	-62.0	-141.8	0.0	0.	0.0	0.
1000.0	-62.0	-141.8	0.0	0.	0.0	0.

VALUES FROM SOIL TEST RESULTS 3/69 FOR ZONE 1 MATERIAL

$\phi = 36°$ $C = 300$ psf

JEP 4-69

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8

BATAVIA KILL SITE NO. 3 MM

UPSTREAM SLOPE 100 PER CENT STANDARD DENSITY ON 4

ARC INPUT DATA

HORIZONTAL DISTANCE FROM CENTERLINE OF DAM TO LEFT MOST ARC CENTER = -160.

HORIZONTAL DISTANCE BETWEEN ARC CENTERS = 10.0 FT.

NUMBER OF HORIZONTAL DISTANCES = 8

VERTICAL DISTANCE FROM TOP OF DAM TO UPPER MOST ARC CENTER = 168.0 FT.

VERTICAL DISTANCE BETWEEN ARC CENTERS = -10.0 FT.

NUMBER OF VERTICAL DISTANCES = 6

DISTANCE BETWEEN ARC RADIUS = 4 FT.

LINE NUMBER TANGENT TO MINIMUM ARC = 4

LINE NUMBER TANGENT TO MAXIMUM ARC = 9

MINIMUM SAFETY FACTOR AND ASSOCIATED RADIUS FOR SELECTED ARC CENTERS

VERTICAL DISTANCE	HORIZONTAL DISTANCE -160.0 RAD	FS	-150.0 RAD	FS	-140.0 RAD	FS	-130.0 RAD	FS	-120.0 RAD	FS	-110.0 RAD	FS	RA
168.0	230	1.799	230	1.795	230	1.834	222	1.899	218	1.964	214	2.083	21
158.0	220	1.802	220	1.783	220	1.807	212	1.871	208	1.925	208	2.029	20
148.0	210	1.813	210	1.774	210	1.786	208	1.840	198	1.891	198	1.980	19
138.0	200	1.828	200	1.773	200	1.770	196	1.815	188	1.859	188	1.934	18
128.0	190	1.849	190	1.781	190	1.759	190	1.792	178	1.829	178	1.894	17
118.0	180	1.876	180	1.793	180	1.754	180	1.771	168	1.806	168	1.861	16

PAUSE

Pg 5-2

STANDARD DENSITY ON 4

****

ARC INPUT DATA

****

OM CENTERLINE OF DAM TO LEFT MOST ARC CENTER = -160.0 FT.

TWEEN ARC CENTERS = 10.0 FT.

ISTANCES = 8

TOP OF DAM TO UPPER MOST ARC CENTER = 168.0 FT.

EEN ARC CENTERS = -10.0 FT.

TANCES = 6

ADIUS = 4 FT.

MINIMUM ARC = 4

MAXIMUM ARC = 9

****

T AND ASSOCIATED RADIUS FOR SELECTED ARC CENTERS

****

	HORIZONTAL DISTANCE -130.0		-120.0		-110.0		-100.0		-90.0	
S	RAD	FS	RAD	FS	RAD	FS	RAD	FS	RAD	FS
4	222	1.899	218	1.964	214	2.083	210	2.253	210	2.473
7	212	1.871	208	1.925	208	2.029	204	2.191	200	2.396
6	206	1.840	198	1.891	198	1.980	194	2.129	190	2.322
0	196	1.815	188	1.859	188	1.934	184	2.067	180	2.251
9	190	1.792	178	1.829	178	1.894	174	2.013	170	2.179
4	180	1.771	168	1.806	168	1.861	168	1.962	160	2.114

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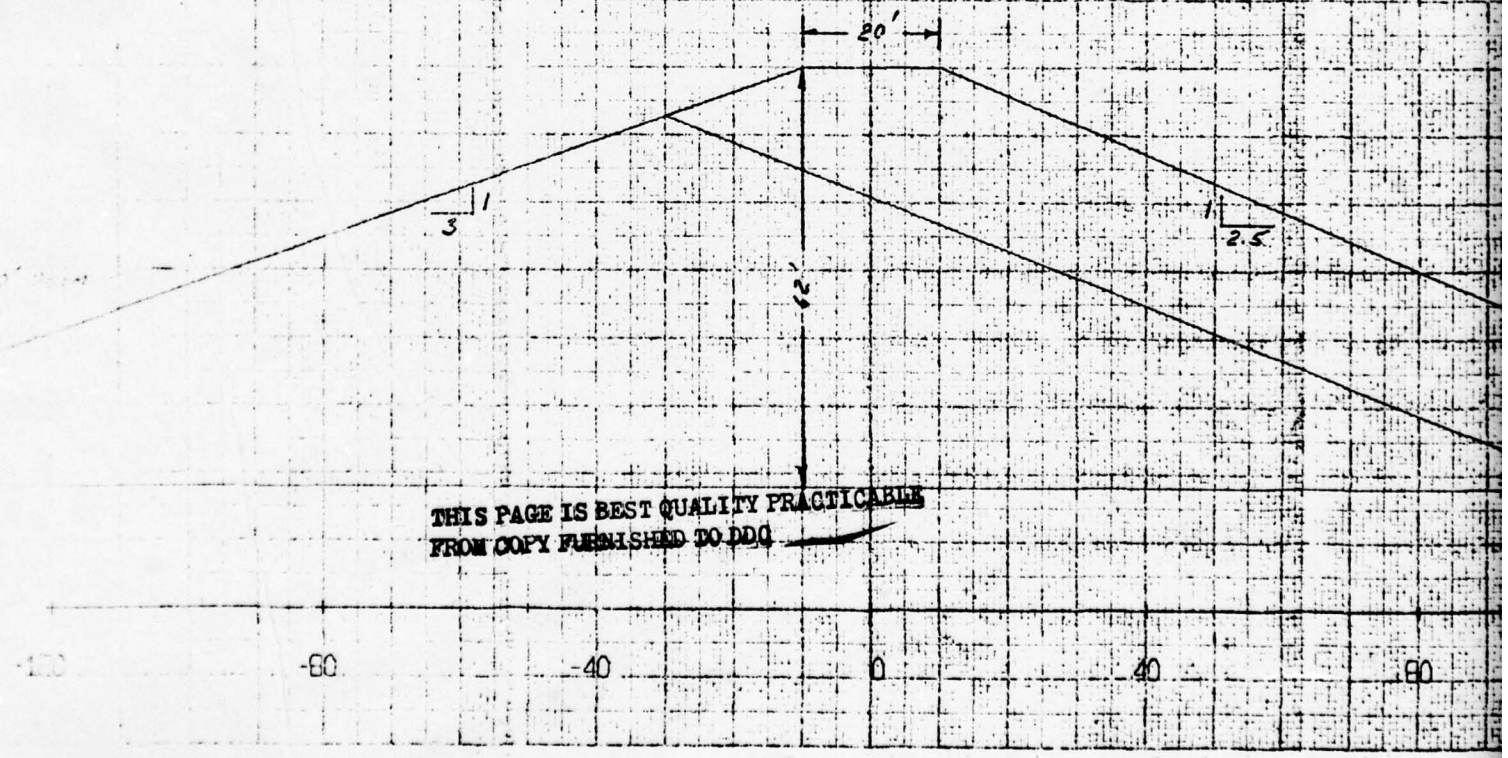
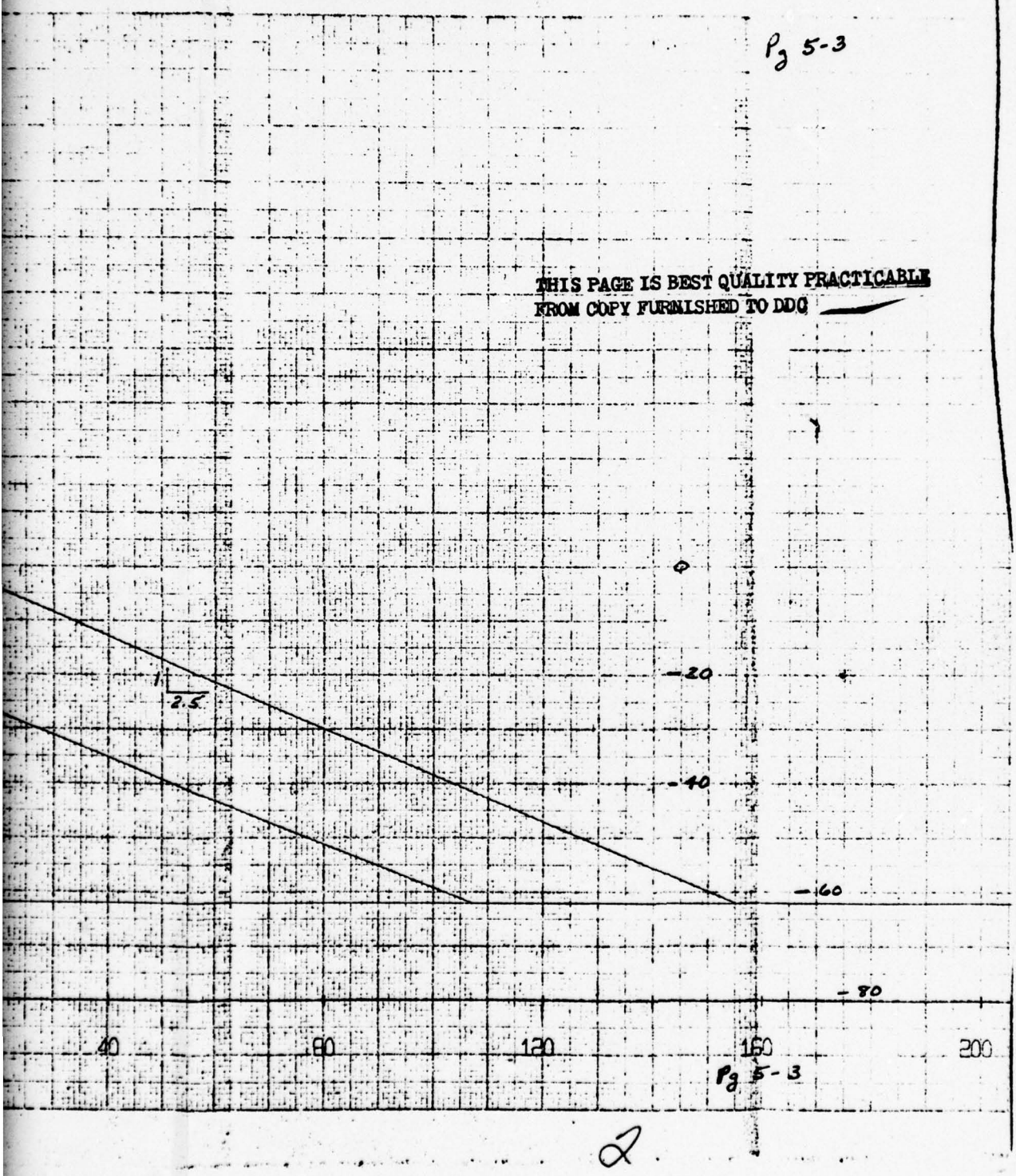
BATAVIA KILL SITE NO. 3





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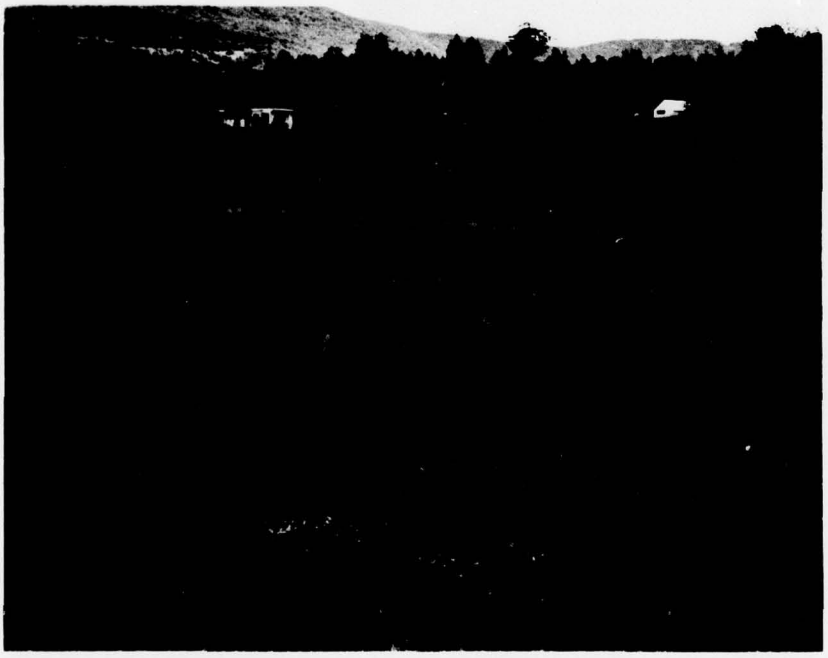
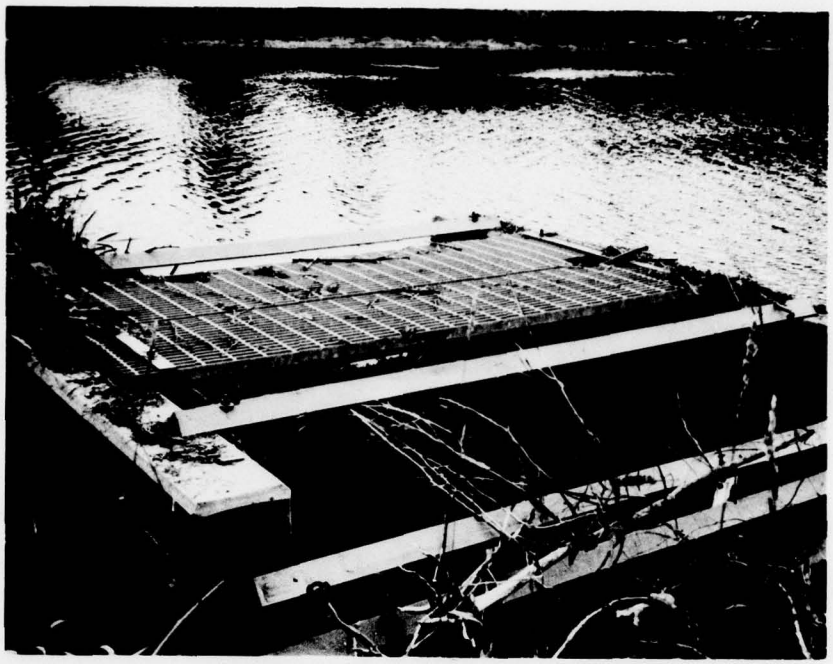
APPENDIX B

PHOTOGRAPHS

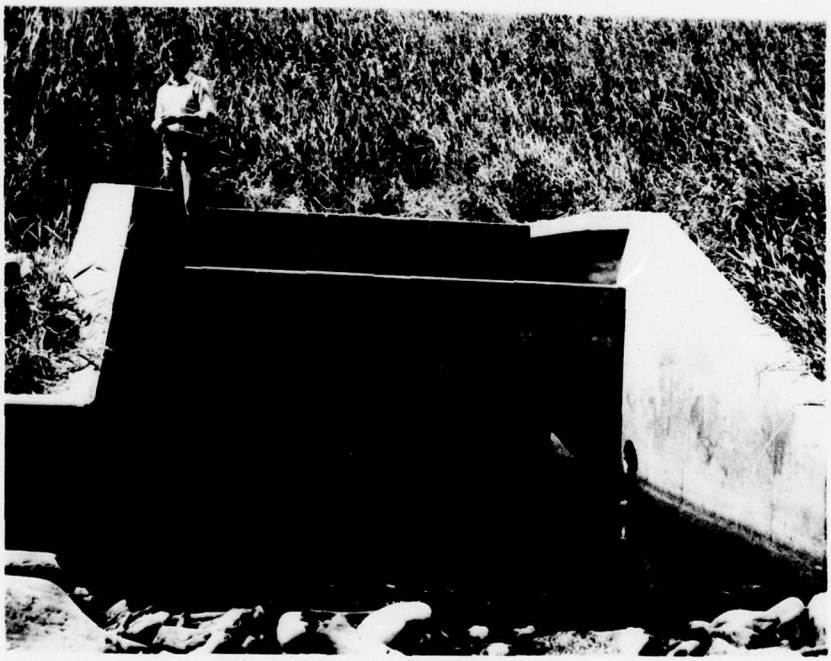
RESERVOIR POOL @ PRINCIPAL SPILLWAY
(looking East)



WEST EMERGENCY SPILLWAY



INLET of PRINCIPAL SPILLWAY
@ RISER



OUTLET of PRINCIPAL SPILLWAY
@ IMPACT BASIN

APPENDIX C

ENGINEERING DATA CHECKLIST

BA[illegible]A

Check List
Engineering Data
Design Construction Operation

Name of Dam DAM #3

I.D. # NY-608
(#191C-3818)

Item	Remarks		
	Plans	Details	Typical Sections
Dam	YES	YES	YES
Spillway(s)	YES	YES	YES
Outlet(s)	YES	YES	YES
Design Reports	YES		
Design Computations			
Discharge Rating Curves			
Dam Stability			
Seepage Studies			
Subsurface and Materials Investigations	YES		

Item	Remarks
Construction History	
Surveys, Modifications, Post-Construction Engineering Studies and Reports	NONE REPORTED
Accidents or Failure of Dam Description, Reports	NONE REPORTED
Operation and Maintenance Records Operation Manual	N/A

APPENDIX D

VISUAL INSPECTION CHECKLIST

VISUAL INSPECTION CHECKLIST

1) Basic Data

a. General

Name of Dam BATAVIA KILL WATERSHED PROJECT DAM No. 3

I.D. # NY-608 (#191C-3818)

Location: Town WINDHAM County GREENE

Stream Name UNNAMED TRIBUTARY TO BATAVIA KILL

Tributary of SCHOHARIE CREEK; MOHAWK RIVER BASIN

Longitude (W), Latitude (N) W 74°-13'-58" N 42°-19'-06"

Hazard Category C

Date(s) of Inspection JULY 11, 1978

Weather Conditions CLEAR 70°

b. Inspection Personnel KOCH McCARTY BERQUIST

ISLAM HARMER

c. Persons Contacted H. HERTH (SCS) E. BLACKMER (SCS)

d. History:

Date Constructed 1970

Owner BATAVIA KILL WATERSHED DISTRICT

Designer SOIL CONSERVATION SERVICE (SCS)

Constructed by HALMAR CONSTR. CORP.

2) Technical Data

Type of Dam EARTH EMBANKMENT

Drainage Area 2304 ACRES

Height 63' Length 1100'

Upstream Slope 1:3 Downstream Slope 1:2.5

2) Technical Data (Cont'd.)

External Drains: on Downstream Face N/A @ Downstream Toe YES

Internal Components:

Impervious Core N/A

Drains UNDER DOWNSTREAM SLOPE

Cutoff Type EARTH TRENCH ; KEYED TO FOUNDATION SOILS

Grout Curtain N/A

3) Embankment

a. Crest

(1) Vertical Alignment GOOD

(2) Horizontal Alignment GOOD

(3) Surface Cracks NONE VISIBLE

(4) Miscellaneous

b. Slopes

(i) Undesirable Growth or Debris, Animal Burrows NONE

(2) Sloughing, Subsidence or Depressions NONE

(3) Slope Protection NO RIPRAP ON UPSTREAM FACE OF THE EMBANKMENT AT ELEVATION OF PRINCIPAL SPILLWAY CREST

(4) Surface Cracks or Movement at Toe NONE

(5) Seepage NONE

(6) Condition Around Outlet Structure SATISFACTORY

c. Abutments

(1) Erosion at Embankment and Abutment Contact NONE

(2) Seepage along Contact of Embankment and Abutment NONE

(3) Seepage at toe or along downstream face NONE

d. Downstream Area - below embankment

(1) Subsidence, Depressions, etc. NONE

(2) Seepage, unusual growth NONE

(3) Evidence of surface movement beyond embankment toe NONE

(4) Miscellaneous

e. Drainage System

INTERNAL UNDER DOWNSTREAM FACE OF THE EMBANKMENT

(1) Condition of relief wells, drains, etc. N/A

(2) Discharge from Drainage System < 5 GPM ; FREELY FLOWING ; CLEAR ; OUTLETED @ SIDEWALLS OF THE IMPACT BASIN

4) Instrumentation

(1) Monumentation/Surveys N/A

(2) Observation Wells N/A

(3) Weirs N/A

(4) Piezometers N/A

(5) Other

5) Reservoir

a. Slopes SATISFACTORY

b. Sedimentation N/A

6) Spillway(s): (including tail race channel)

WATER SURFACE ELEVATION SLIGHTLY ABOVE THE PRINCIPAL SPILLWAY CREST

a. General

b. Principle Spillway 18' HIGH RECTANGULAR RC DROP INLET; 30" DIA. RC PRESSURE PIPE; IMPACT BASIN

SATISFACTORY

c. Emergency or Auxiliary Spillway 2 GRASS-LINED TRAPEZOIDAL OPEN CHANNELS IN EARTH CUTS; ONE EACH SIDE OF THE MAIN EMBANKMENT SATISFACTORY EXCEPT THE GRASS INVERTS NEED MOWING

d. Condition of Tail race channel SATISFACTORY

e. Stability of Channel side/slopes GOOD

7) Downstream Channel

a. Condition (debris, etc.) GOOD WITH SOME DEBRIS AND LOGS SCATTERED ALONG THE INVERT

b. Slopes ERODED

c. Approximate number of homes 60 INCL. VILLAGE OF WINDHAM

8) Miscellaneous

9) Structural

a. Concrete Surfaces SATISFACTORY

b. Structural Cracking NONE

c. Movement - Horizontal & Vertical Alignment (Settlement) N/A

d. Junctions with Abutments or Embankments

e. Drains - Foundation, Joint, Face

f. Water passages, conduits, sluices

g. Seepage or Leakage N/A

h. Joints - Construction, etc. _____

i. Foundation _____

j. Abutments _____

k. Control Gates RESERVOIR DRAIN SLIDE GATE IS OPERATIONAL BUT WAS NOT REPOSITIONED AT THE TIME OF INSPECTION

l. Approach & Outlet Channels _____

m. Energy Dissipators (~~plunge pool~~, ~~etc.~~) IMPACT BASIN - SATISFACTORY

n. Intake Structures _____

o. Stability _____

p. Miscellaneous _____

APPENDIX E

HYDROLOGIC/HYDRAULIC ENGINEERING

DATA AND COMPUTATIONS

CHECK LIST FOR DAMS
HYDROLOGIC AND HYDRAULIC
ENGINEERING DATA

AREA-CAPACITY DATA:

	Elevation (ft.)	Surface Area (acres)	Storage Capacity (acre-ft.)
1) Top of Dam	1746.9	71.0	1415
2) Design High Water (Max. Design Pool)	1741.9	59.0	1095
3) Auxiliary Spillway Crest	1739.7	54.3	975
4) Pool Level with Flashboards	N/A		
5) Service Spillway Crest	1699.7	4.6	23.0

DISCHARGES

	Volume (cfs)
1) Average Daily	N/A
2) Spillway @ Maximum High Water	132
3) Spillway @ Design High Water	N/A
4) Spillway @ Auxiliary Spillway Crest Elevation	125
5) Low Level Outlet	28
6) Total (of all facilities) @ Maximum High Water	17600
7) Maximum Known Flood	90

CREST: ELEVATION: 1746.9

Type: LEVEL ; GRASSED EARTH

Width: 20' Length: 1100'

Spillover N/A

Location

SPILLWAY:

PRINCIPAL		EMERGENCY
1699.7	Elevation	1739.7
RC DROP INLET W/ TRASH RACK	Type	TRAPEZOIDAL OPEN CHANNELS
2'-6" x 7'-6"	Width	EAST - 50', WEST - 200' SLOPES: 1:3
	Type of Control	
✓	Uncontrolled	✓
	Controlled:	
N/A	Type (Flashboards; gate)	N/A
N/A	Number	N/A
N/A	Size/Length	N/A
	Invert Material	MOWED GRASS
	Anticipated Length of operating service	< 1 PER 100 YRS
30" DIA RC CONDUIT - 326'	~~Chute~~ Length	EAST - 205' WEST - 690'
SHARP-CRESTED L/b = 1.0 WEIR LENGTH = 15.0'	Height Between Spillway Crest & Approach Channel Invert (Weir Flow)	N/A BROAD-CRESTED

~~OUTLET STRUCTURES~~/EMERGENCY DRAWDOWN FACILITIES:

Type: Gate ✓ Sluice _____ Conduit ✓ Penstock _____

Shape : GATE - FLAT CIRCULAR CONDUIT - ROUND CAST IRON

Size: GATE - 16" DIA. CONDUIT - 16" DIA.

Elevations: Entrance Invert 1685.5

Exit Invert 1682.95

Tailrace Channel: Elevation 1677.0

HYDROMETEROLOGICAL GAGES:

Type : _____

Location: _____

Records:

Date - _____

Max. Reading - _____

FLOOD WATER CONTROL SYSTEM:

Warning System: NONE

_____

Method of Controlled Releases (mechanisms):

N/A EXCEPT FOR RESERVOIR DRAIN SLIDE GATE - MANUALLY OPERATED

DRAINAGE AREA: 2304 ACRES 3.6 SQ. MI.

DRAINAGE BASIN RUNOFF CHARACTERISTICS:

Land Use - Type: FARM FIELDS & WOODLANDS

Terrain - Relief: MODERATE TO STEEP W/ STEEPER SLOPES IN UPPER REACHES OF WATERSHED

Surface - Soil:

Runoff Potential (existing or planned extensive alterations to existing (surface or subsurface conditions)

NONE

Potential Sedimentation problem areas (natural or man-made; present or future)

N/A

Potential Backwater problem areas for levels at maximum storage capacity including surcharge storage:

N/A

Dikes - Floodwalls (overflow & non-overflow) - Low reaches along the Reservoir perimeter:

Location: NONE

Elevation:

Reservoir:

Length @ Maximum Pool N/A (Miles)

Length of Shoreline (@ Spillway Crest) N/A (Miles)

BATAVIA KILL #3
#191C-3818

1. RUNOFF (10.21)

P = 23, CN = 80 } Q_e = 20.3 (inv.)

CN (SCS) = 79 (USE 80)

[PMF - 6 HOUR ≤ 10 SQ MILES]

5. Hydrograph Family (21.83)

P = 23, CN = 80 } Hydrograph Family #1

DRAINAGE AREA
2304 ACRES
or
3.6 SQ. MI.

6. Duration of Excess Rainfall (21.85)

P = 23, CN = 80 } T_o = 5.7 Hrs.

7. T_c = 1.32 Hrs. (TIME OF CONCENTRATION)

$T_p = .7\ T_c$

$T_p = .7\ (1.32) = 0.924$ Hrs.

8. $\frac{T_o}{T_p} = 6.17$

9. Revised $\frac{T_o}{T_p}$ (21.59)

Family #1, $\frac{T_o}{T_p} = 6.17$ } $\frac{T_o}{T_p} = 6$

10. Revised $T_p = \frac{T_o}{\frac{T_o}{T_p}\ Rev.} = \frac{5.7}{6} = 0.95$

11. Compute q_p

$$q_p = \frac{484\ A}{Rev.\ T_p} = \frac{484 \times 3.6}{0.95} = 1834 \text{ cfs.}$$

12. Compute Q_{qp}

$Q_{qp} = Q \times q_p$

$= 20.3 \times 1834 = 37230$ cfs

A in Sq Miles

HYDROGRAPH FAMILY "1" } □ (21.17)

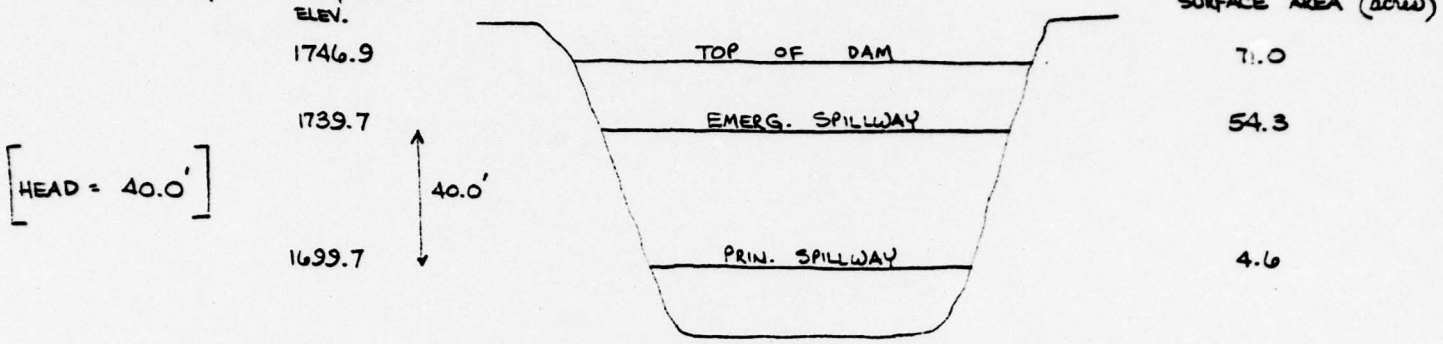
REV. $\frac{To}{Tp} = 6$

DAM: #191C-3818

(21.17) LINE NO.	(21.17) $\frac{t}{Tp}$	(#10) Rev Tp = 0.95 $t = \frac{t}{Tp}(\text{Rev } Tp)$	(21.17) $\frac{qc}{qp}$	(#12) Qqp = 37230 $q = \frac{qc}{qp}(Qqp)$	HYDROGRAPH PEAK INFLOW	REMARKS
1						
2						
3						
4						
5						
6						
7			.386	14371		
8			.497	18503 cfs	*	USE 18500
9			.430	16009		

BATAVIA KILL #3
#191C - 3818

SPILLWAY ANALYSIS :



Reservoir Detention Volume (RDV) :

$$RDV = A \times h = \left(\frac{54.3 + 4.6}{2}\right)(40.0) = 1178.0 \text{ AF}$$

Inflow Runoff Volume (IRV) :

$$IRV = \frac{Q}{12} \times A_{DR} = \frac{20.3}{12} \times 2304 = 3397.6 \text{ AF}$$

Ratio : $\frac{RDV}{IRV} = \frac{1178}{3397.6} = .302$

Ratio : $\frac{OPR}{IPR} = .86$

$$OPR = (.86)\,IPR = (.86)(18503) = 15913 \text{ cfs}$$ [OUTFLOW PEAK RATE]

(USE 15900 cfs)

BATAVIA KILL #3

#191C - 3818

SPILLWAY DISCHARGES : [PMF]

PEAK OUTFLOW = 15913 cfs

PRIN. SPILLWAY = 125 cfs (W.S. ELEV. = CREST EMERG. SPILLWAY)

REQ'D IN 2 EMERG. SPILLWAYS — 15788 cfs

EMERG. SPILLWAYS : ANALYZE AS BROAD-CRESTED WEIR

$Q = CLH^{3/2}$

C = 3.087 L = 250' = 50' + 200' (BOTTOM WIDTH EAST + WEST)

$H^{3/2} = \frac{Q}{CL} = \frac{15788}{(3.087)(250)}$

$H^{3/2} = 20.457402$

H = 7.5' (ACTUAL H = 7.2')

	WIDTH EAST	WEST
TOP	93.2	243.2
BOTTOM	50	200
AVE. :	71.6	221.6

L = 293.2

$H^{3/2} = 17.443214$

H = 6.7'

FREEBOARD = 0.5'

DISCHARGE IN EMERGENCY SPILLWAYS @ MAX. HIGH WATER (7.2' FLOW DEPTH)

$Q = CLH^{3/2} = (3.087)(293.2)(7.2)^{3/2}$

[OUTFLOW] Q = 17486 cfs (USE 17468 cfs)

PRINCIPAL SPILLWAY CAPACITY @ MAX. HIGH WATER : (30" CONDUIT – FLOW CONTROL)

ELEV. – TOP OF DAM 1746.9

PIPE OUTLET 1677.0

HEAD = 69.9' (ORIFICE ; FULL FLOW)

$$q = A\sqrt{\frac{2gH}{1 + K_e + K_b + K_p L}}$$

$A(30" \text{ PIPE}) = 4.909 \text{ ft}^2$

$H = 69.9'$ $L = 326.33'$

$K_e = 0.5$ $K_b = 0.45$ $K_p = 0.0123$

$$= 4.909\sqrt{\frac{2(32.2)(69.9)}{1 + 0.5 + 0.45 + \underbrace{(.0123)(326.33)}_{4.242}}}$$

$$= 4.909\sqrt{726.9961}$$

[OUTFLOW] $q = 132.4$ cfs

PRINCIPAL SPILLWAY CAPACITY @ W.S. ELEVATION = CREST OF EMERGENCY SPILLWAYS

ELEV. – EMERG. SPILLWAY CREST 1739.7

PIPE OUTLET 1677.0

HEAD = 62.7' (ORIFICE ; FULL FLOW)

$$q = 4.909\sqrt{\frac{2(32.2)(62.7)}{1.95 + 4.242}}$$

$$= 4.909\sqrt{652.1124}$$

[OUTFLOW] $q = 125.4$ cfs

BATAVIA KILL #3

#191C-3818

RESERVOIR DRAIN CAPACITY @ W.S. ELEV. = CREST OF PRIN. SPILLWAY

16" ϕ CAST IRON $n = .015$

HEAD = 16.75' (1699.7 − 1682.95 = 16.75)

$A = 1.396\ ft^2$ $L = 44'$ $K_e = 0.5$ $K_b = .02$ $K_p = .02846$

$$q = A\sqrt{\frac{2gH}{1 + K_e + K_b + K_pL}}$$

$$= 1.396\sqrt{\frac{2(32.2)(16.75)}{1 + 0.5 + .02 + \underbrace{(.02846)(44)}_{1.094}}}$$

$$= 1.396\sqrt{412.66058}$$

$q = 28.4$ cfs [OUTFLOW]

BEND = $\frac{2.5}{40} = .0625 = \tan B$

$B = 3.576^\circ = 3^\circ 35'$

$K_b = \frac{nB}{3} = \frac{(.015)(3.576)}{3} = .018$

$K_p = \frac{5100\,n^2}{D^{4/3}} = \frac{5100(.015)^2}{(16)^{4/3}} = .02846$

MAXIMUM KNOWN FLOOD @ ELEV. = 1709.7 (10' above PRIN. SPILLWAY CREST)

ELEV. − 1709.7

PIPE OUTLET − 1677.0

HEAD ——— 32.7'

$$q = 4.909\sqrt{\frac{2(32.2)(32.7)}{1.95 + 4.242}}$$

$$= 4.909\sqrt{340.09687}$$

[OUTFLOW] $q = 90.5$ cfs

APPENDIX F

REFERENCES

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